

FY2018 Basin Highlights Report & FY2019 Coordinated Monitoring



**CANADIAN AND RED RIVER
BASINS ADVISORY COMMITTEE MEETING**



APRIL 10, 2018 – AMARILLO, TEXAS

**Jose Martinez
CRP Project Manager**

Presentation Overview



- Water Quality Parameters
- Water Quality Monitoring in the Canadian River Basin
- Water Quality Monitoring in the Red River Basin
- Biological Monitoring in the Canadian River Basin
- Biological Monitoring in the Red River Basin
- Future Monitoring Goals for FY 2019

Water Quality Parameters - Assessed



- Water quality is assessed every two years by TCEQ
- *Texas Integrated Report (IR)*
- *2014 IR* is the most current approved assessment
 - Currently working on the *Draft 2016 IR*
- Impairments versus Concerns
 - Impairments – 303(d)
 - Concerns – 305(b)
- There are two types of Concerns
 - CS – concern for water quality based on screening level
 - CN – concern for near non-attainment of the water quality standard

Water Quality Parameters - Assessed



- Segments identify waterbodies
 - Classified – example 0214
 - Unclassified – example 0214B
- Segments are comprised of smaller units
 - Assessment Units (AUs) – 0214B_01
- Assessment Units contain monitoring stations
- This is where the water quality data used for assessments and trend analysis comes from
 - Monitoring Station 10094, Buffalo Creek at FM 1814

Water Quality Parameters



Solids/Dissolved Solids

Parameter	Cause / Source	Impact
TSS (Total Suspended Solids)	Sources may include point and nonpoint sources. The most common source is soil erosion. Land disturbance in riparian areas typically increases TSS levels.	Increased turbidity can reduce the amount of light to plants which decreases the oxygen production.
TDS (Total Dissolved Solids)	Sources of TDS include weathering and dissolution of rocks and soils, agricultural and stormwater runoff and point source discharges.	TDS is a quantification of the materials dissolved in water, typically chloride and sulfate anions which form salts.
Chloride	Natural weathering and leaching of sedimentary rocks, soils, and salt. Other sources include oil exploration and storage, sewage and industrial discharges.	Chloride, a salt, is an essential element for maintaining normal physiological functions in all organisms.
Sulfate	Soluble sulfate occurs in almost all natural waters. It is often dissolved into waters from rocks and soils containing gypsum, iron sulfides, and other sulfur compounds.	Sulfate can affect taste and odor of drinking water.

Water Quality Parameters



Nutrients

Parameter	Cause / Source	Impact
Ammonia	Ammonia is excreted by animals and is produced during the decomposition of plants and animals. Produced by the breakdown of compounds containing organic nitrogen.	Elevated ammonia levels are a good indicator of organic pollution and can adversely affect fish and invertebrate reproductive capacity and stunt growth.
Nitrate	Nitrates are used as fertilizers to supply a nitrogen source for plant growth.	Nitrate additions to surface waters can lead to excessive growth of aquatic plants.
Total Phosphorus	An essential nutrient, required for growth of organisms. Sources include wastewater, agricultural drainage, and certain industrial wastes.	Excessive amounts of total phosphorus increase primary productivity and algal growth. It also contributes to the eutrophication of lakes.
Chlorophyll-a	Chlorophyll-a is a photosynthetic pigment, found in all green plants and algae. The concentration of Chlorophyll-a is used to estimate phytoplankton biomass in surface water.	In the presence of sunlight and abundant food sources, photosynthesis increases. Excessive Chlorophyll-a can cause extreme cyclical swings in DO and pH.

Water Quality Parameters



Bacteria

Parameter	Cause / Source	Impact
<i>E. coli</i>	Bacteria present in warm bodied animals. It may come from poorly maintained or ineffective septic systems, overflow of domestic wastewater plants and/or runoff from feedlots.	The primary indicator bacteria used to determine if a fresh water body is suitable for contact recreation. Typically not harmful, but their presence is an indicator of fecal matter contamination which may contain other pathogens.
Enterococcus	Bacteria present in warm bodied animals.	Typically not harmful, but their presence is an indicator of fecal matter contamination which may contain other pathogens. This bacteria has shown to be more hearty in waterbodies with high conductivity and salinity.

Water Quality Parameters



Aquatic Health

Parameter	Cause / Source	Impact
Dissolved Oxygen	Excessive amounts of organic material and algal blooms may cause DO levels to fluctuate. The resulting low levels of DO can stress or kill aquatic life.	Dissolved oxygen is vital to fish and other aquatic life. It is the most frequently used indicator of a water body's ability to support aquatic life.
pH	Industrial and wastewater discharges, runoff, accidental spills, and non point sources. Human activity that causes increases in organic matter and bacteria, and over abundant algae.	Most aquatic organisms function best in a pH range of 6.0 to 9.0. Higher alkalinity levels in surface waters will buffer acid rain and other acid wastes and prevent pH changes that are harmful to aquatic life.
Temperature	Natural changes in water temperature occur seasonally. Changes can also be caused by alteration of the riparian zone, drought, or as a result of industrial uses such as electrical generation.	Colder water typically contains higher amounts of DO. As temperatures fluctuate, there is a direct effect on dissolved oxygen levels.

Canadian Reach I



- Canadian River Below Lake Meredith (0101)
 - Bacteria impairment
 - Chlorophyll-*a*, ammonia, and depressed DO concerns
- Dixon Creek (0101A)
- Rock Creek (0101B)
- White Deer Creek (0101C)

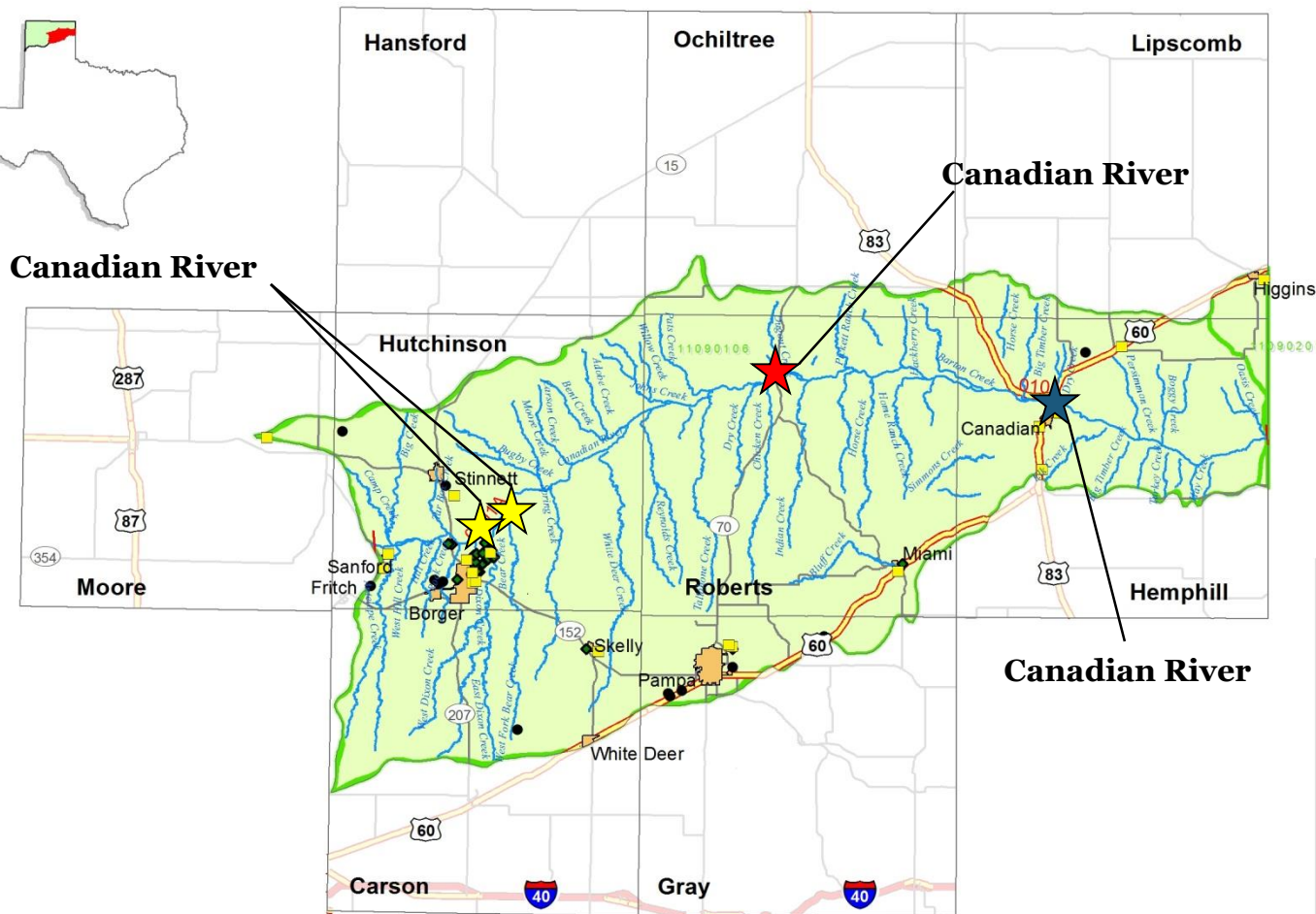


Canadian River Basin

Reach I



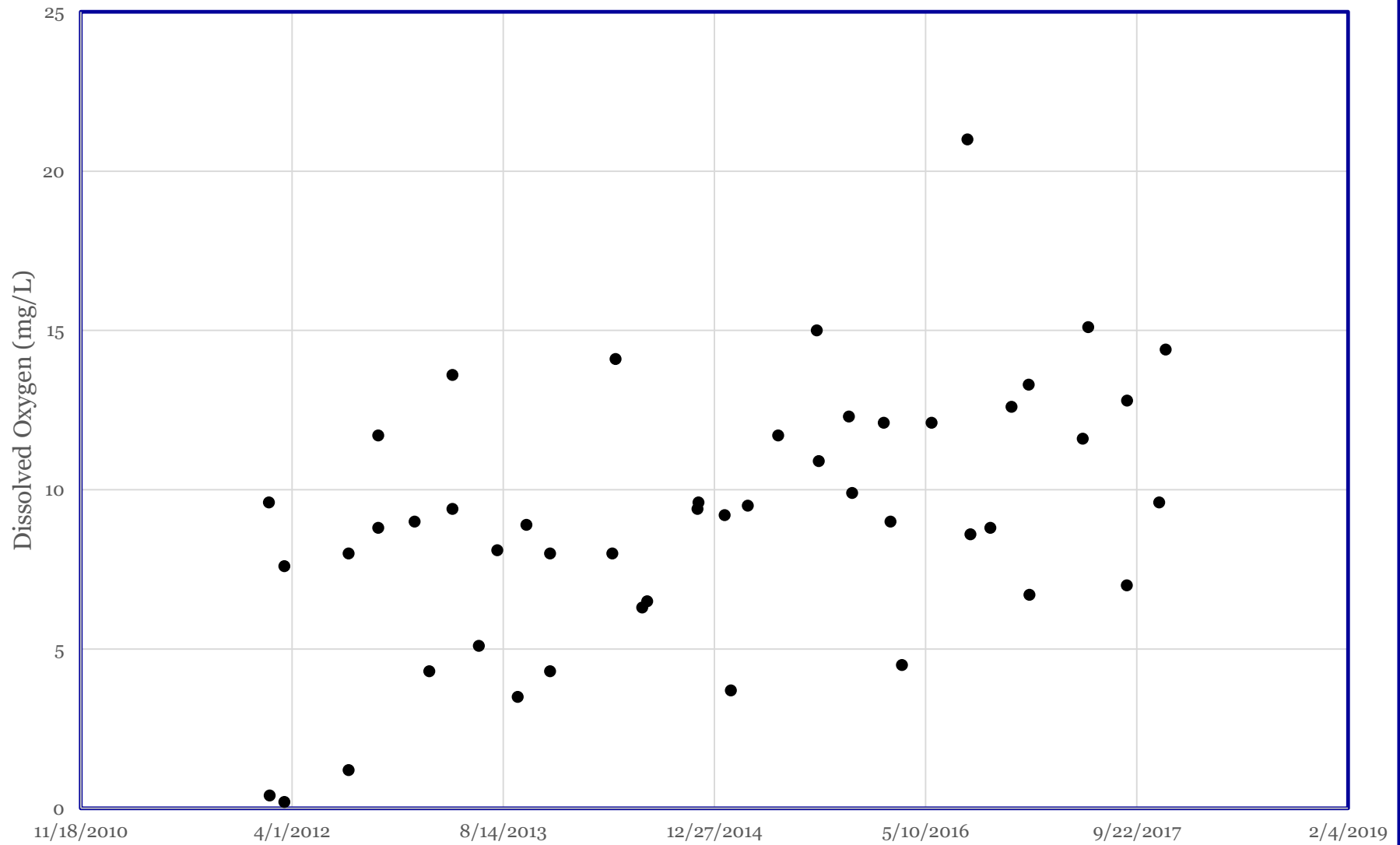
0 4.5 9 18
Miles



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach I

Canadian River Below Lake Meredith
Segment 0101_04
Dissolved Oxygen



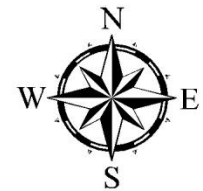
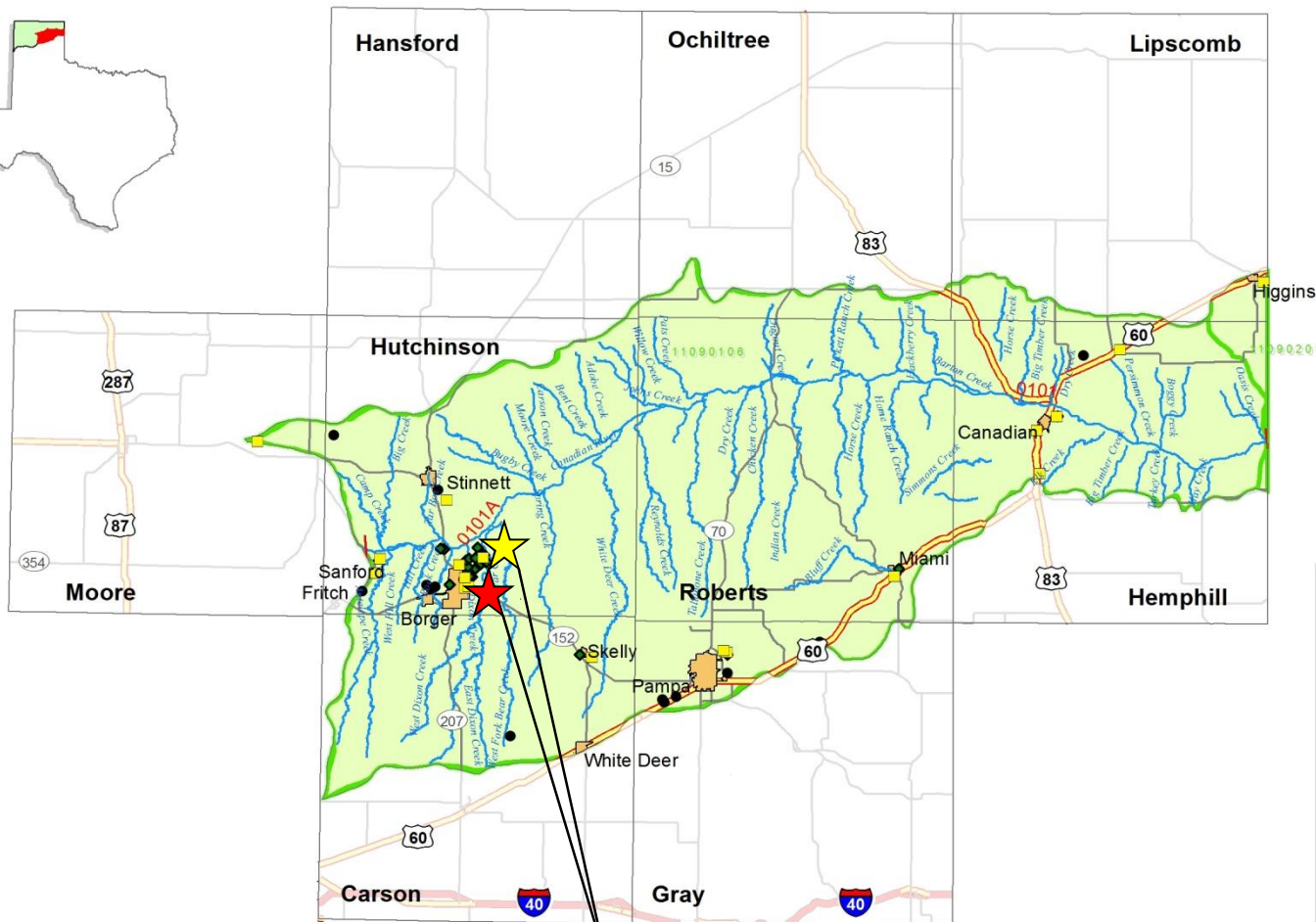
Canadian Reach I



- Canadian River Below Lake Meredith (0101)
- Dixon Creek (0101A)
 - Bacteria, depressed DO, and selenium impairments
 - Chlorophyll-*a* and nitrate concerns
 - RUAA has been completed and submitted to TCEQ
- Rock Creek (0101B)
- White Deer Creek (0101C)



Canadian River Basin Reach I



0 4.5 9 18
Miles

Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach I

Dixon Creek

Dixon Creek at SH 152 – 1/8/2018



Dixon Creek at SH 152 – 4/3/2018



Canadian Reach I



- Canadian River Below Lake Meredith (0101)
- Dixon Creek (0101A)
- Rock Creek (0101B)
 - No impairments
 - Nitrate, chlorophyll-*a*, total phosphorus concerns
- White Deer Creek (0101C)

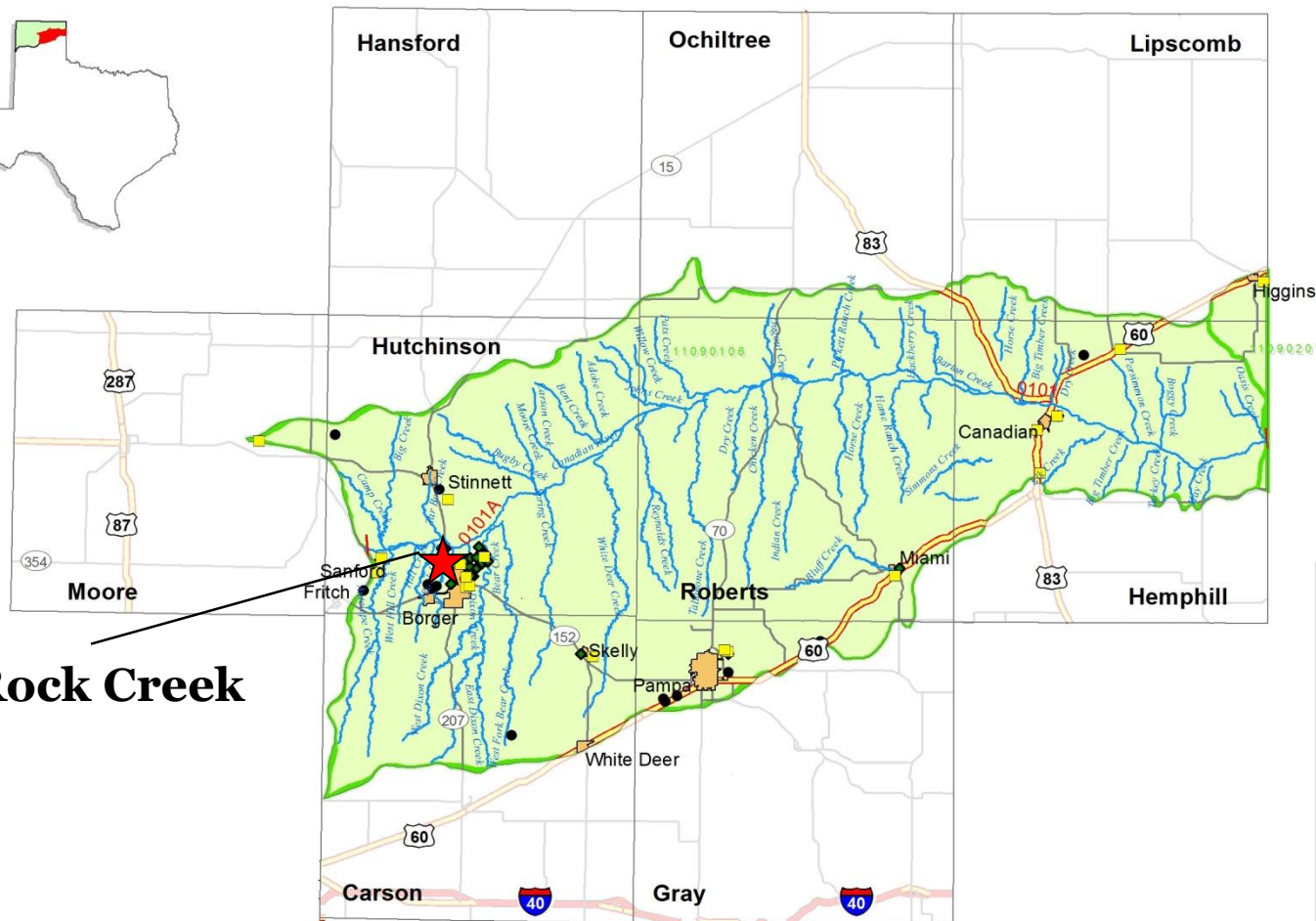


Canadian River Basin Reach I



0 4.5 9 18
Miles

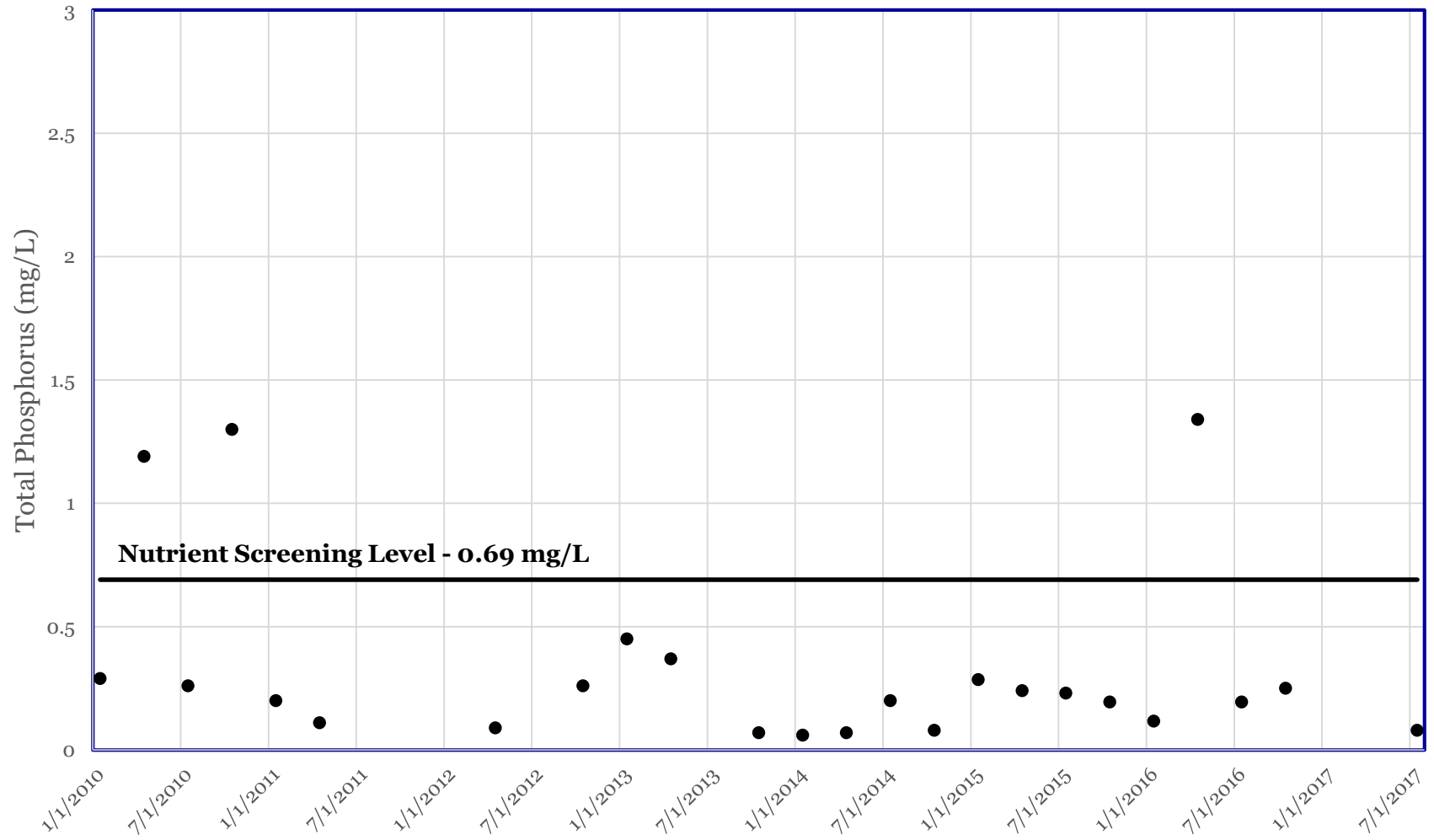
Rock Creek



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach I

Rock Creek
Segment 0101B_01
Total Phosphorus



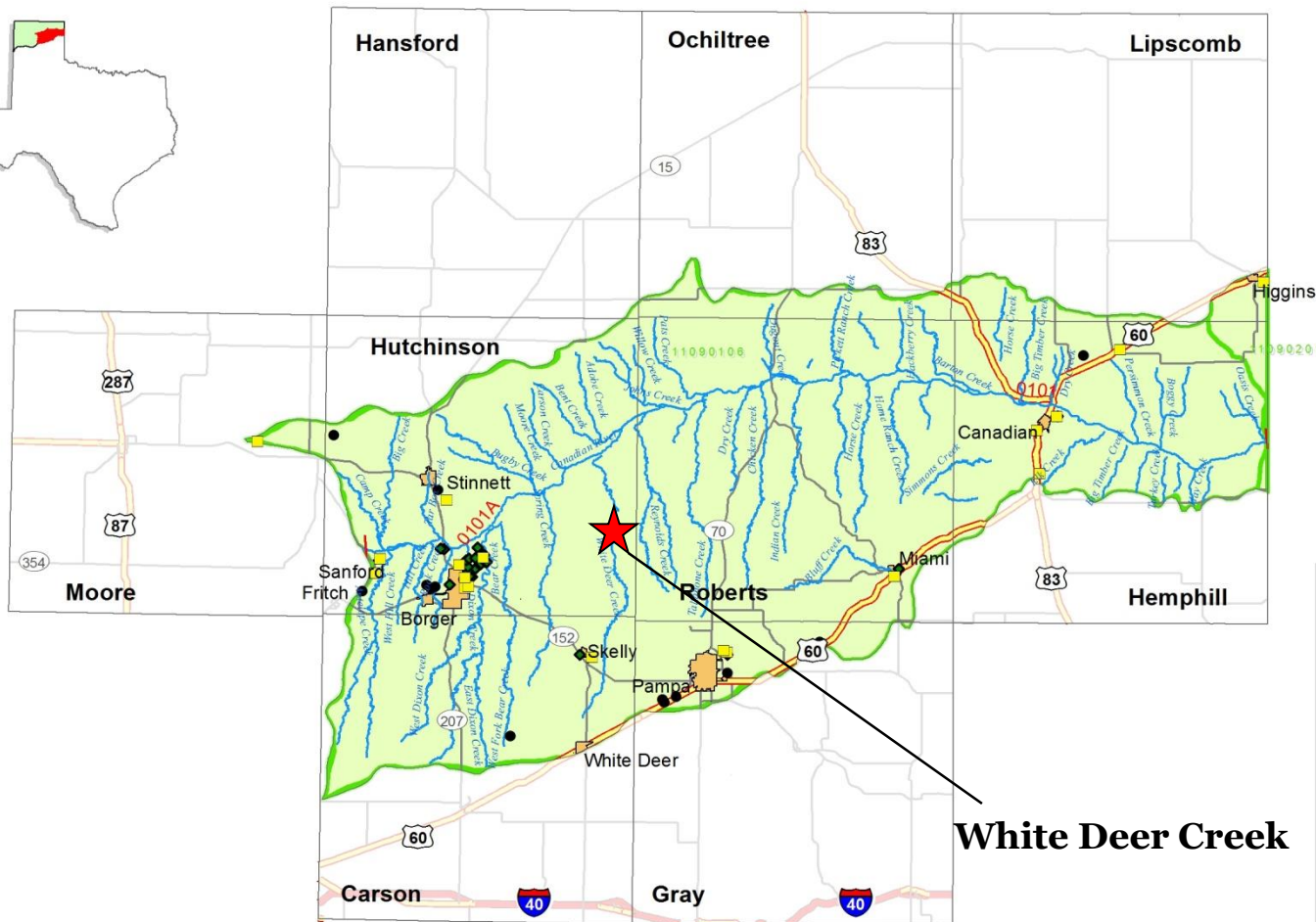
Canadian Reach I



- Canadian River Below Lake Meredith (0101)
- Dixon Creek (0101A)
- Rock Creek (0101B)
- White Deer Creek (0101C)
 - No impairments or concerns
 - Aquatic Life Monitoring – May 2016



Canadian River Basin Reach I



0 4.5 9 18
Miles

Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach I

White Deer Creek at Jeep Crossing – 4/3/2018



Canadian Reach II



- Lake Meredith (0102)
 - Mercury in edible fish tissue, chloride, sulfate, TDS impairments
 - No concerns
- Canadian River Above Lake Meredith (0103)
- Big Blue Creek (0102A)
- East Amarillo Creek (0103A)
- Unnamed Tributary to West Amarillo Creek (0103C)

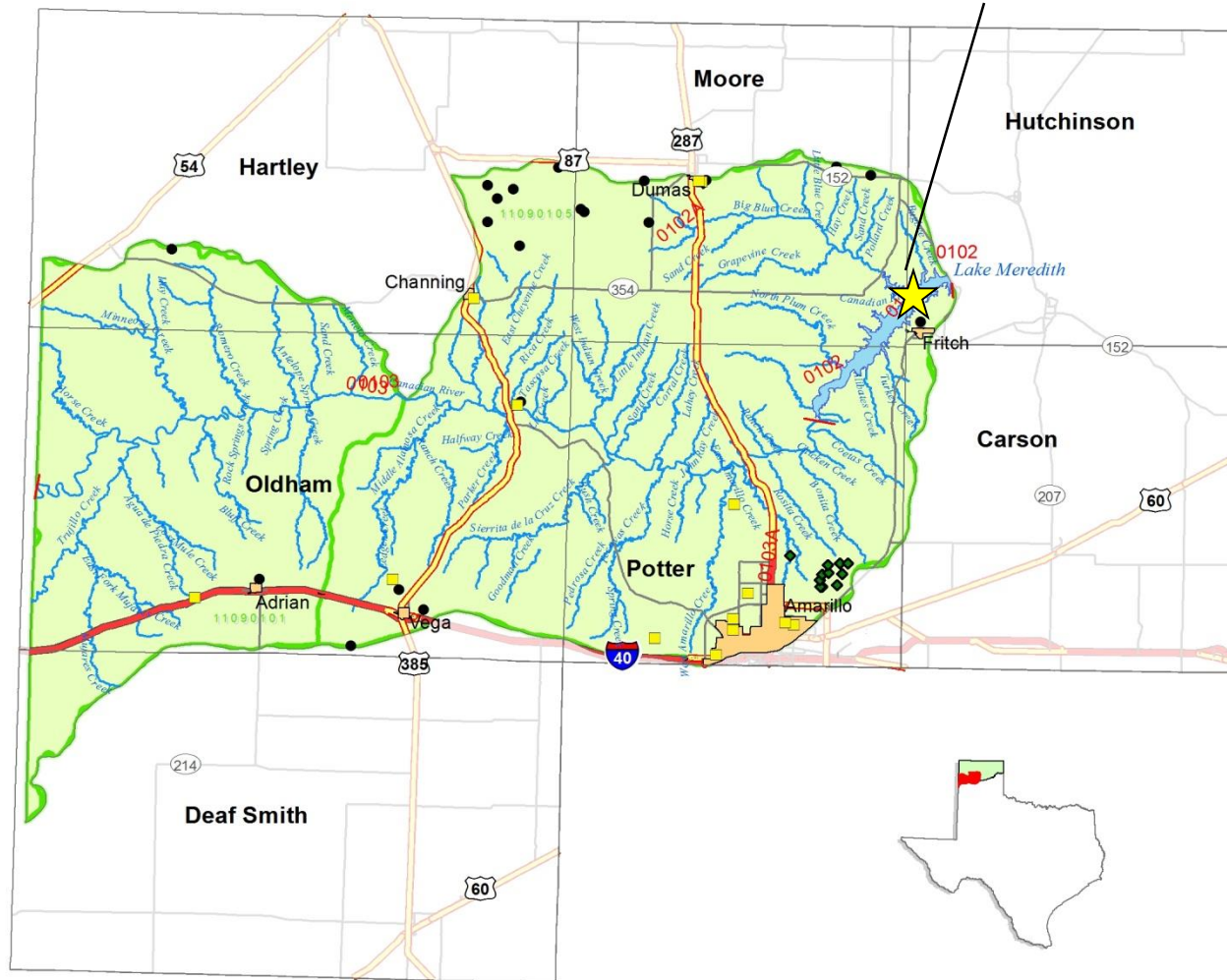


Canadian River Basin

Reach II



Lake Meredith

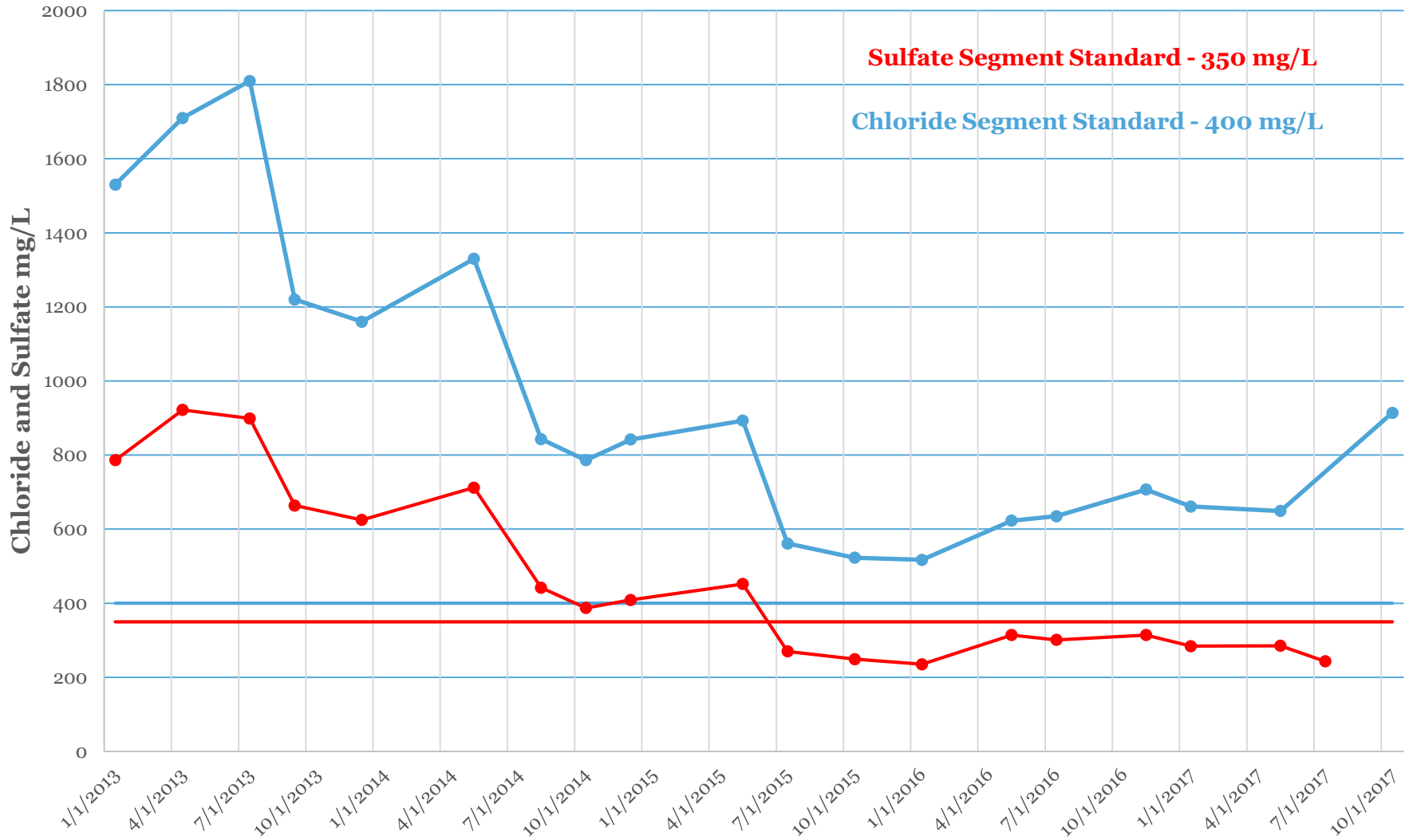


0 4.25 8.5 17
Miles

Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach II

**Lake Meredith
Segment 0102_01
Chloride and Sulfate**



Canadian Reach II

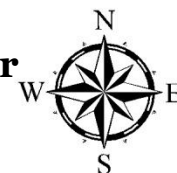
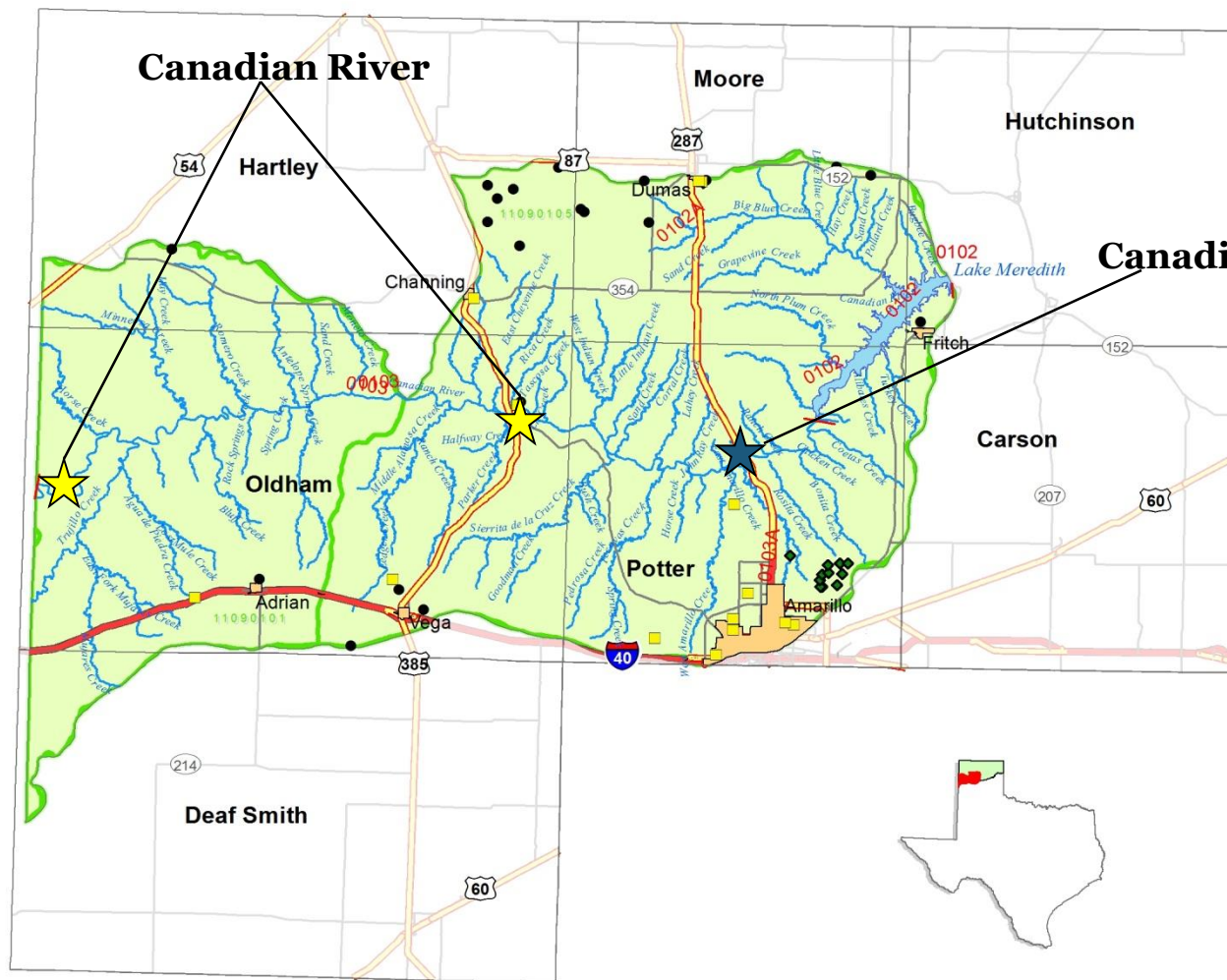


- Lake Meredith (0102)
- Canadian River Above Lake Meredith (0103)
 - Chloride impairment
 - Bacteria concern
- Big Blue Creek (0102A)
- East Amarillo Creek (0103A)
- Unnamed Tributary to West Amarillo Creek (0103C)



Canadian River Basin

Reach II



0 4.25 8.5 17
Miles

Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach II

Canadian River at US 287 – 10/9/2017



Canadian Reach II

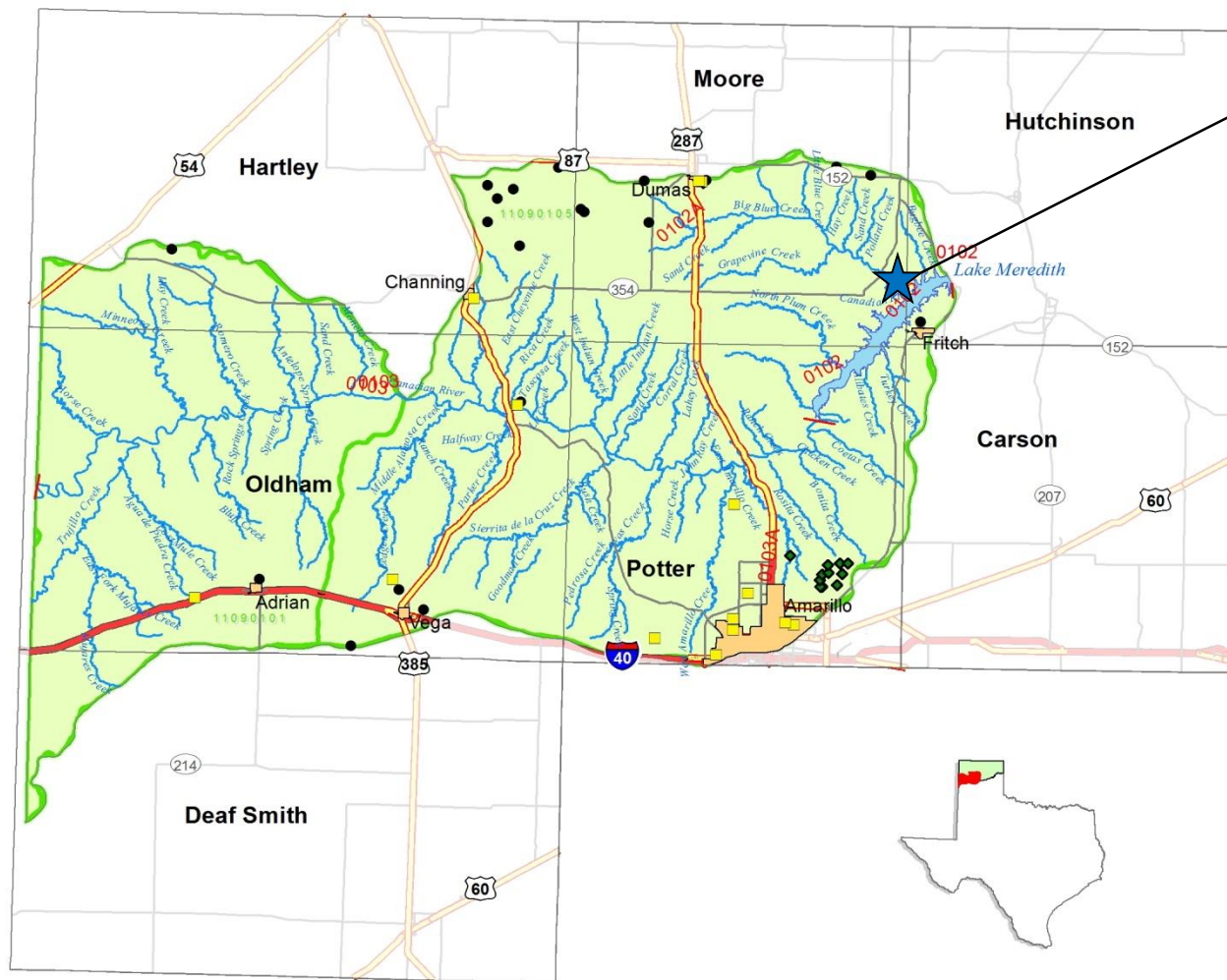


- Lake Meredith (0102)
- Big Blue Creek (0102A)
- Canadian River Above Lake Meredith (0103)
- Big Blue Creek (0102A)
 - No impairments or concerns
- East Amarillo Creek (0103A)
- Unnamed Tributary to West Amarillo Creek (0103C)

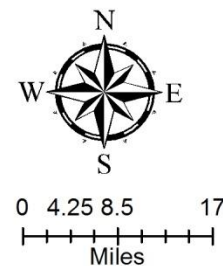


Canadian River Basin

Reach II



Big Blue Creek



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach II

Big Blue Creek at FM 1913 – 10/9/2017



Canadian Reach II

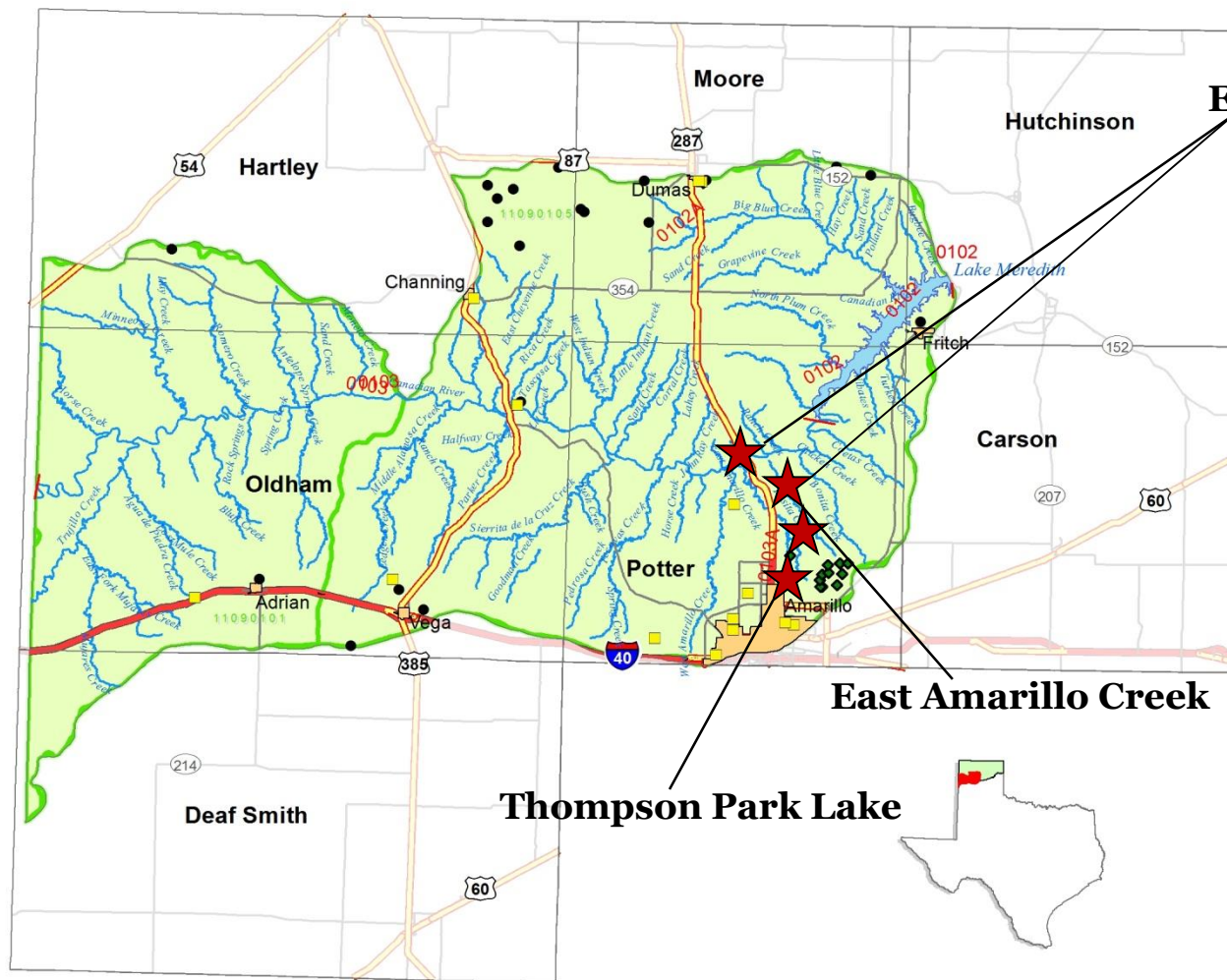


- Lake Meredith (0102)
- Big Blue Creek (0102A)
- Canadian River Above Lake Meredith (0103)
- Big Blue Creek (0102A)
- East Amarillo Creek (0103A)
 - No impairments
 - Chlorophyll-*a* and nitrate concerns
- Unnamed Tributary to West Amarillo Creek (0103C)



Canadian River Basin

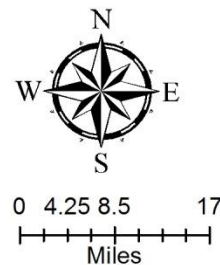
Reach II



East Amarillo Creek

East Amarillo Creek

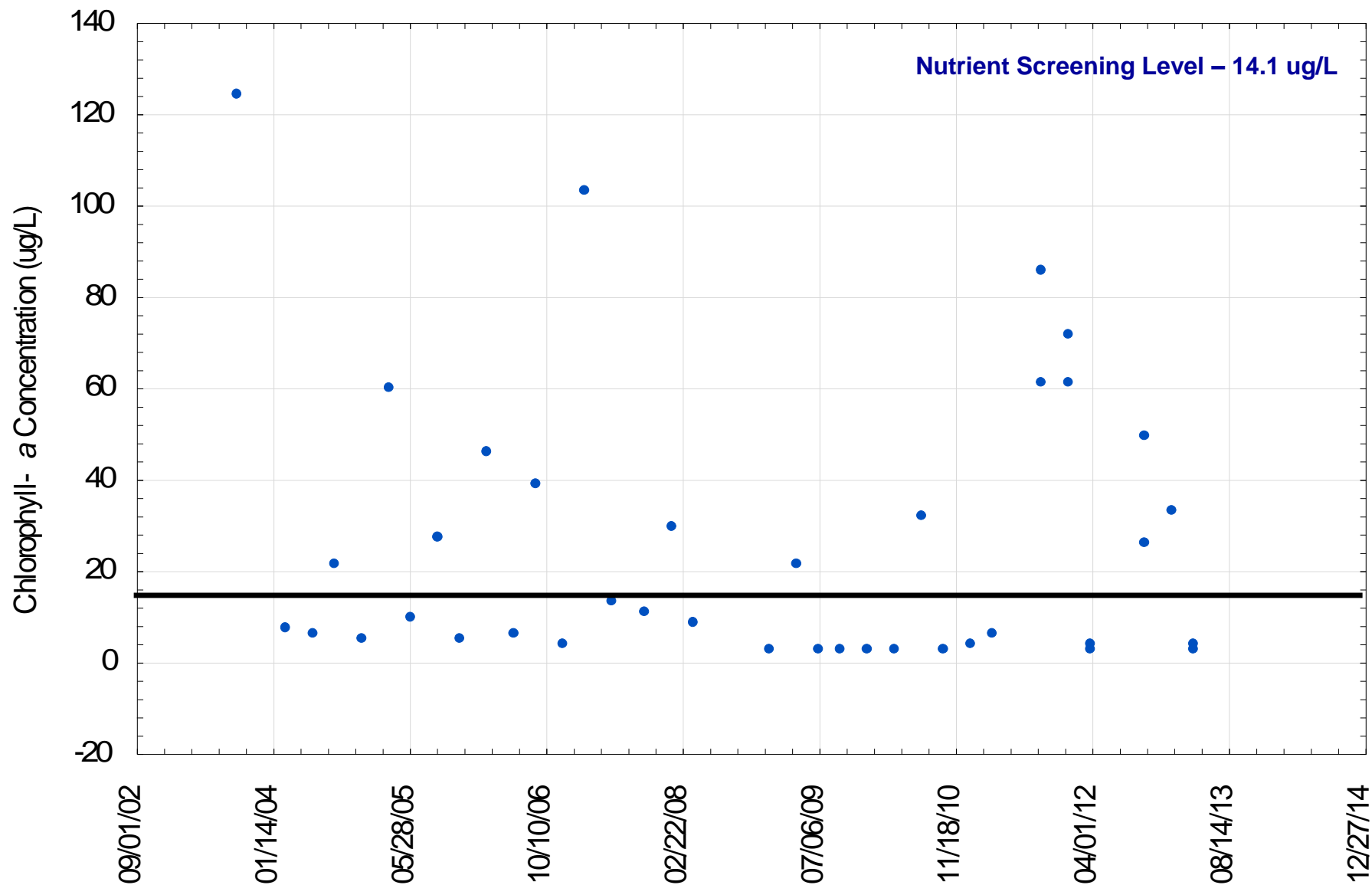
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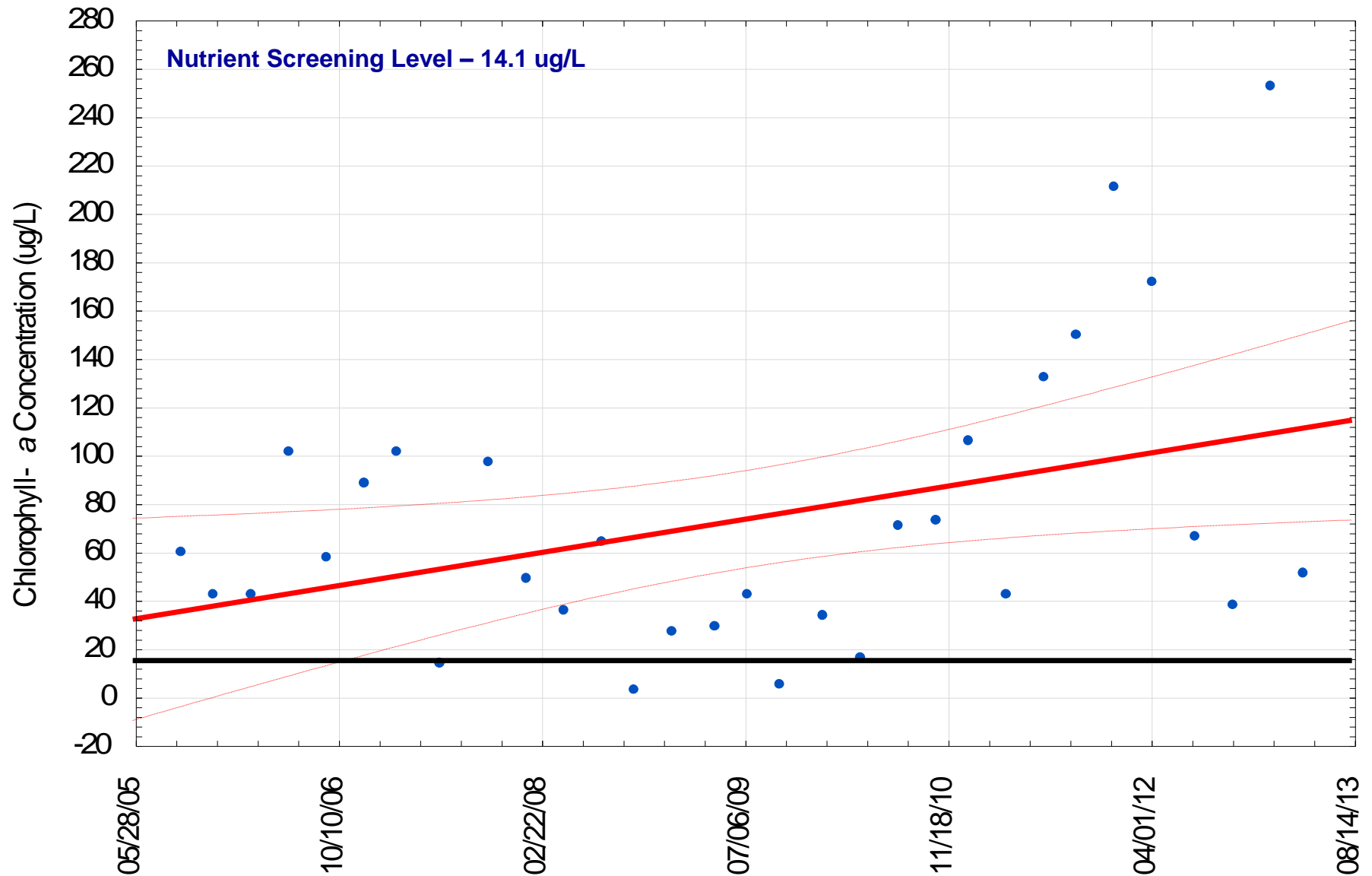
Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach II

East Amarillo Creek
Segment0103A_01
Chlorophyll-
a



East Amarillo Creek
Segment 0103A_02
Chlorophyll-_a



Canadian Reach II

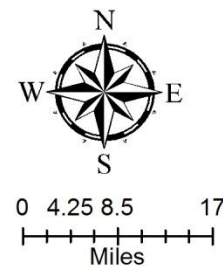
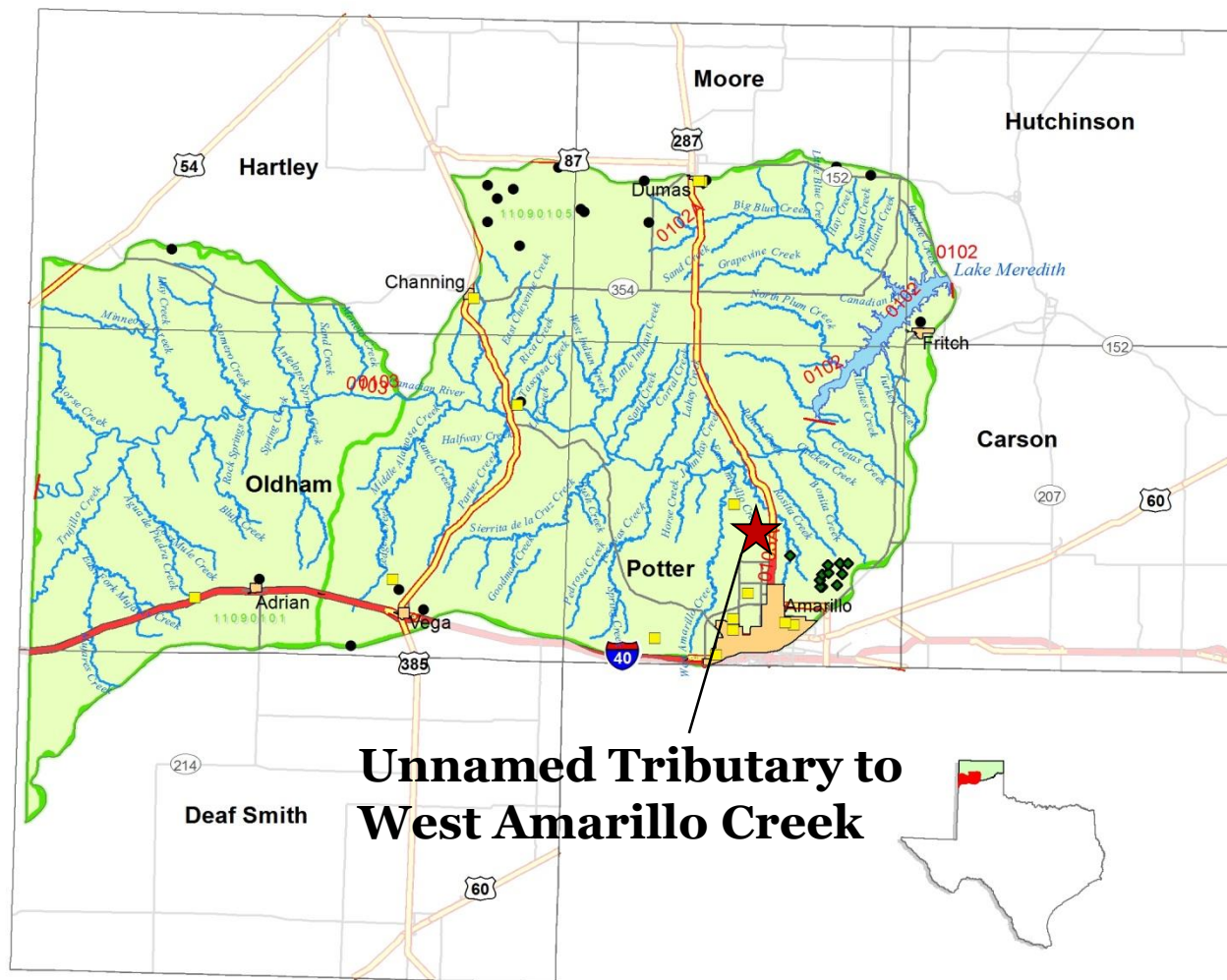


- Lake Meredith (0102)
- Big Blue Creek (0102A)
- Canadian River Above Lake Meredith (0103)
- East Amarillo Creek (0103A)
- Unnamed Tributary to West Amarillo Creek (0103C)
 - No impairments
 - Chlorophyll-*a* concern



Canadian River Basin

Reach II



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach II

Un Trib. to West Amarillo Creek 4/3/2018



Canadian Reach III

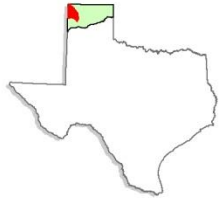


- Rita Blanca Lake (0105)
 - pH and chloride impairment
 - Ammonia, chlorophyll-*a*, nitrate, total phosphorus concerns

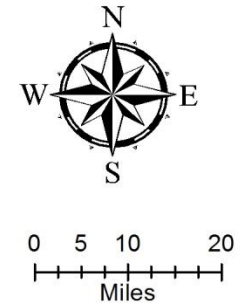
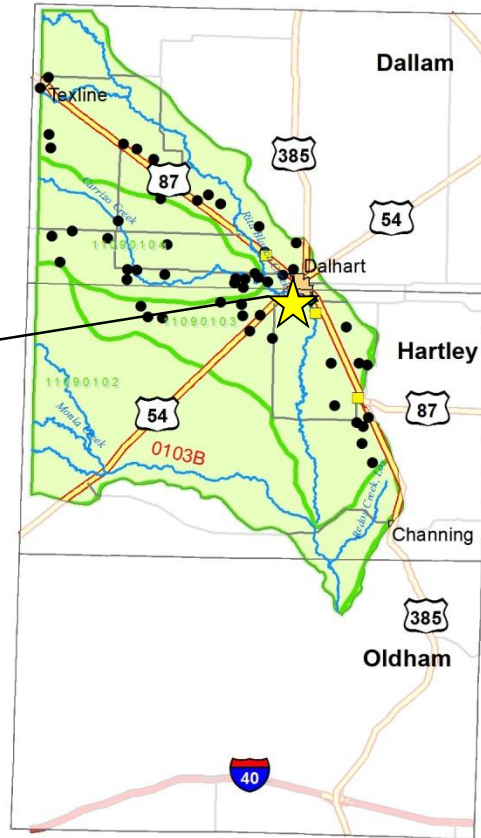


Canadian River Basin

Reach III



Rita Blanca Lake



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- 0101 Segment ID
- Hydrology
- County Boundary
- Urbanized Area
- HUA Boundary
- Canadian Reach III

Canadian Reach IV

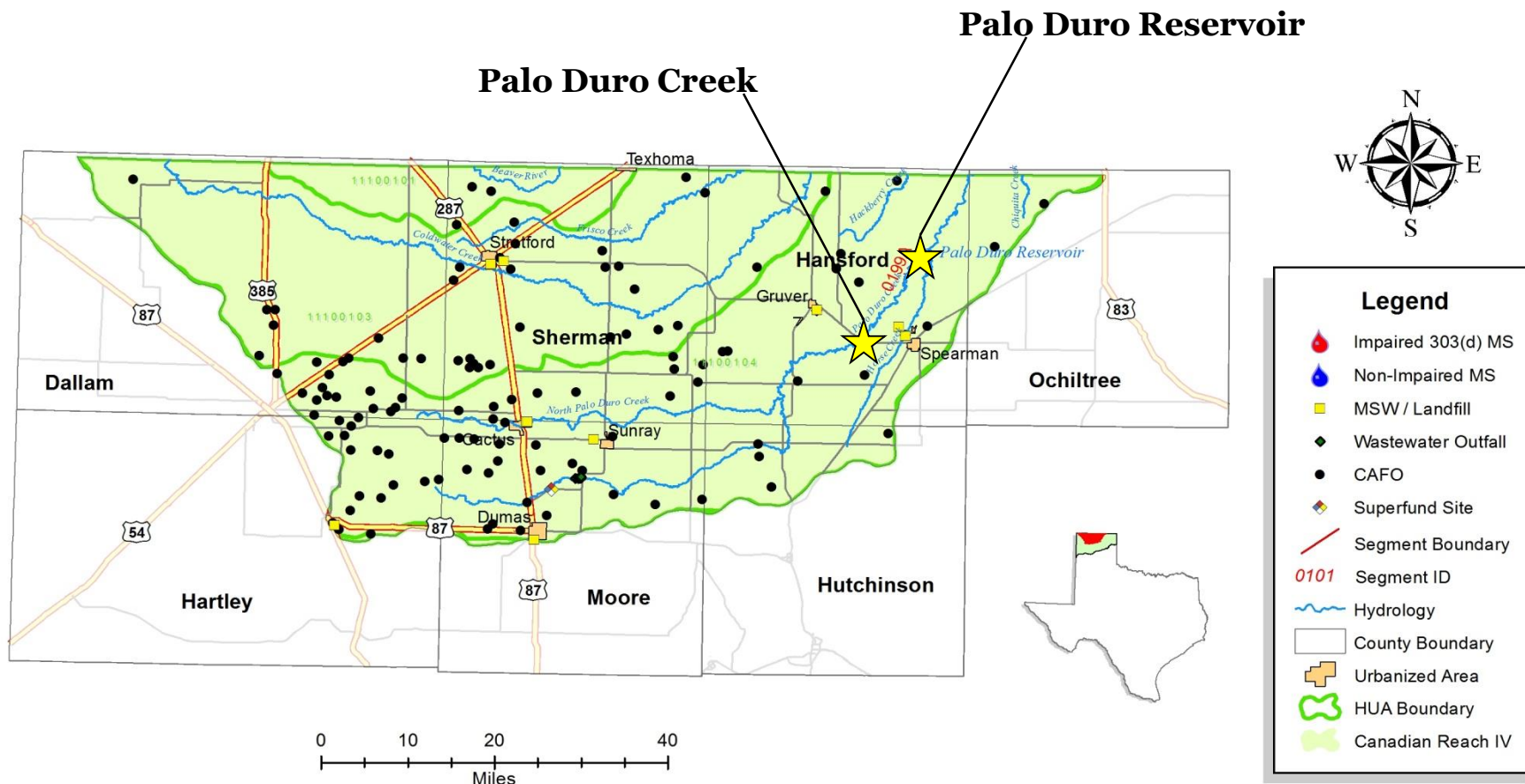


- Palo Duro Reservoir (0199A)
 - No impairments
 - Total phosphorus concern



Canadian River Basin

Reach IV



Canadian Reach V

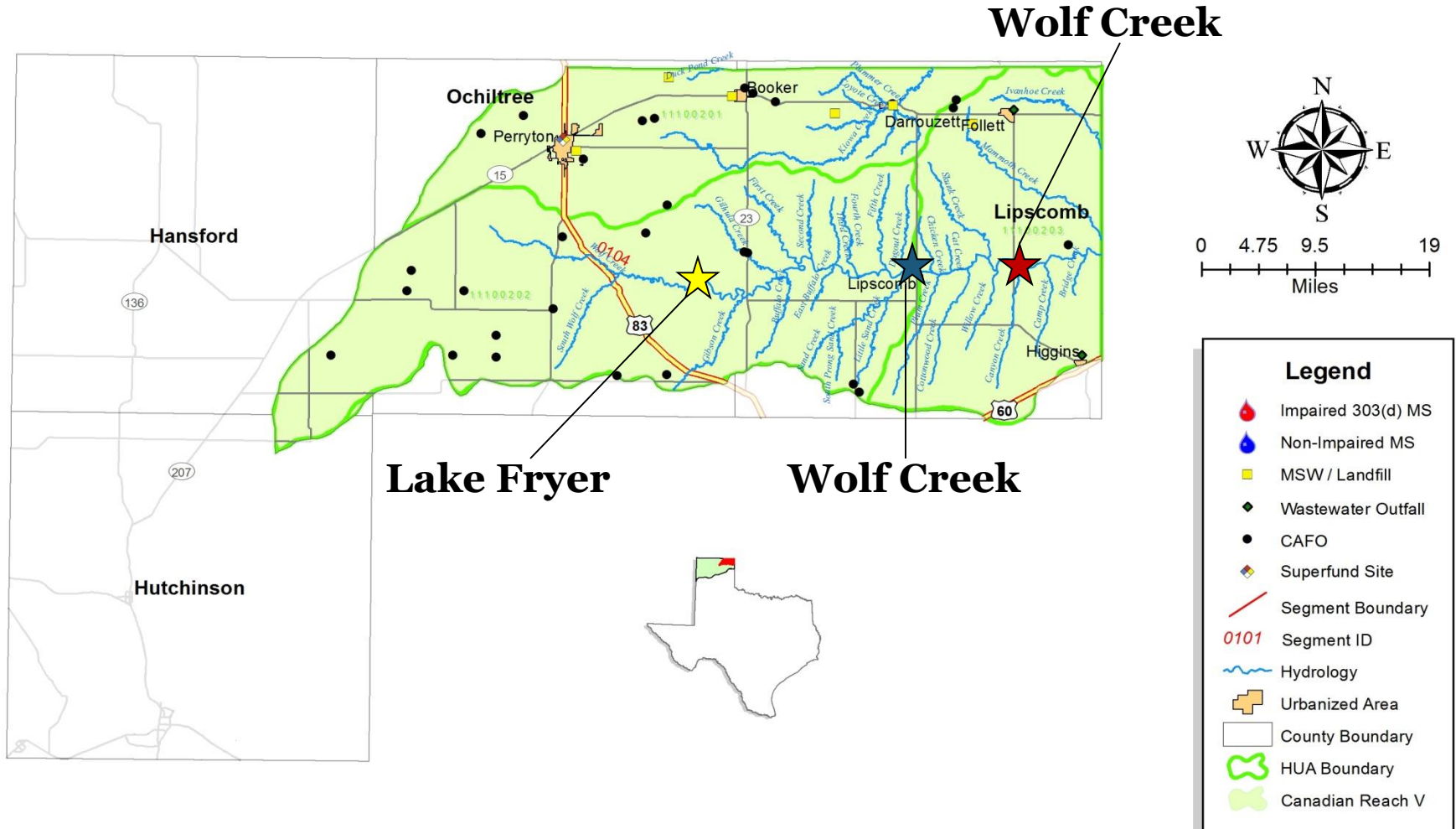


- Wolf Creek (0104)
 - No impairments
 - Chlorophyll-*a* concern
 - Least Disturbed Stream Study – May 2016 and 2017
- Kiowa Creek (0199B)



Canadian River Basin

Reach V



Wolf Creek at SH 305 – LDS Study



Wolf Creek at SH 305 – LDS Study



Canadian Reach V



- Wolf Creek (0104)
- Kiowa Creek (0199B)
 - No impairments or concerns

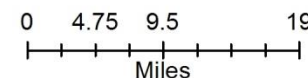
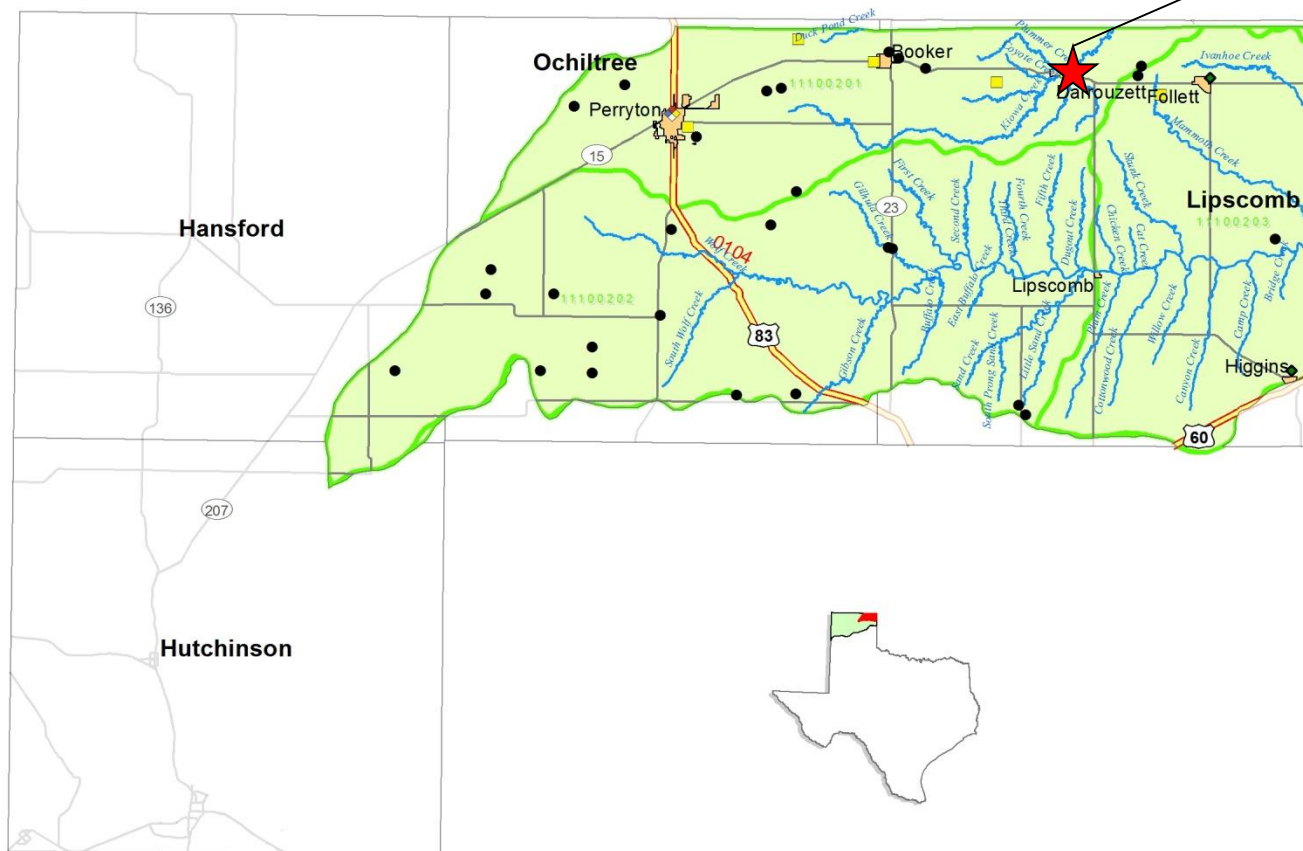


Canadian River Basin

Reach V



Kiowa Creek



Legend

- Impaired 303(d) MS
- Non-Impaired MS
- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0101 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Canadian Reach V

Red Reach IV



- Lower PDTF Red River (0207)
 - Bacteria impairment
 - Chlorophyll-*a* concern
- Buck Creek (0207A)
- Mackenzie Reservoir (0228)
- Upper PDTF Red River (0229)
- Lake Tanglewood (0229A)

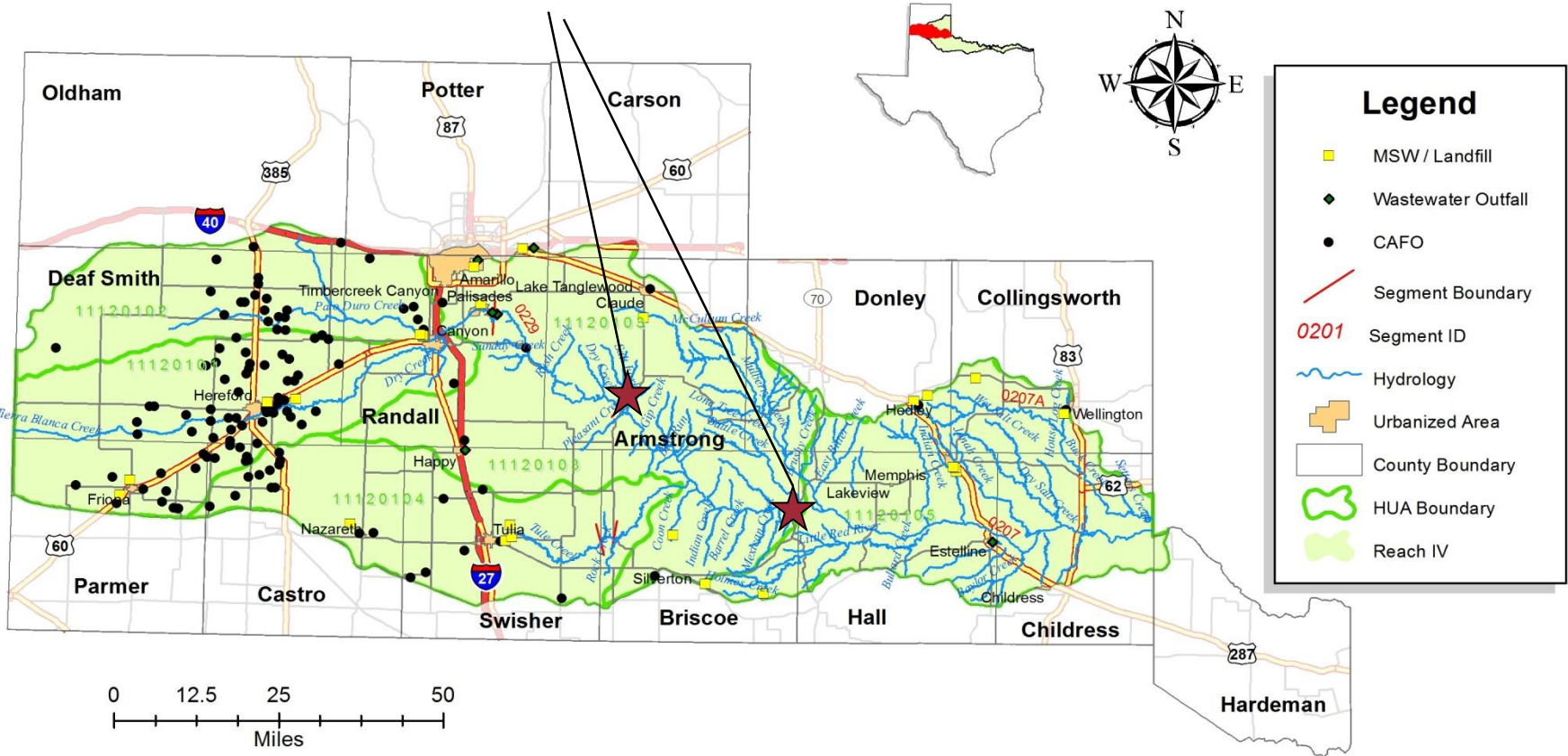


Red River Basin

Reach IV



Lower PDTF Red River



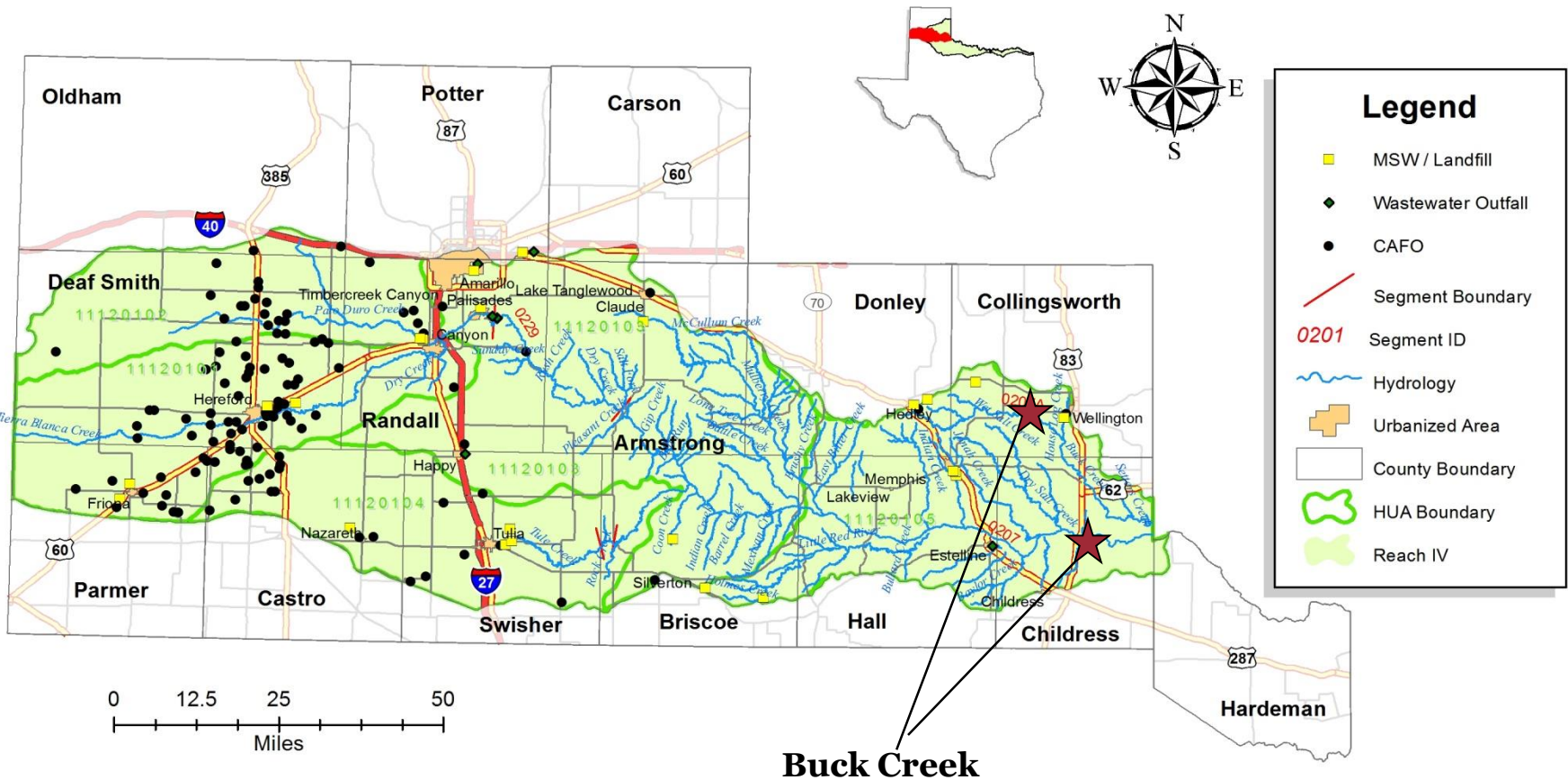
LPDTF Red River at US 70 – 10/10/2017



Red Reach IV



- Lower PDTF Red River (0207)
- Buck Creek (0207A)
 - No impairments
 - Nitrate concern
- Mackenzie Reservoir (0228)
- Upper PDTF Red River (0229)
- Lake Tanglewood (0229A)



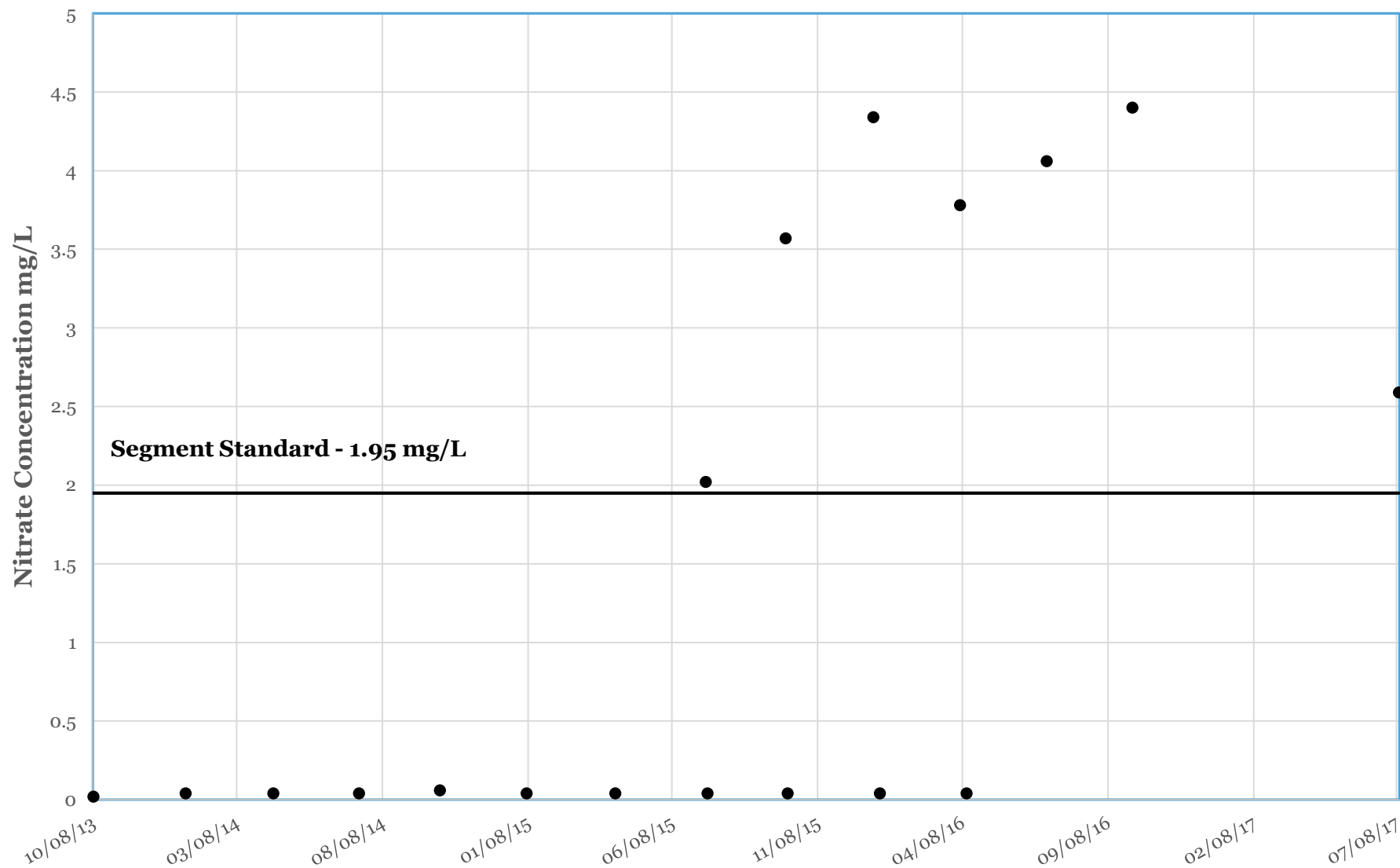
Buck Creek at RR 1547 – 4/12/2017



Buck Creek at US 83 – 4/4/2017



**Buck Creek
Segment 0207A_01
Nitrate**



Red Reach IV

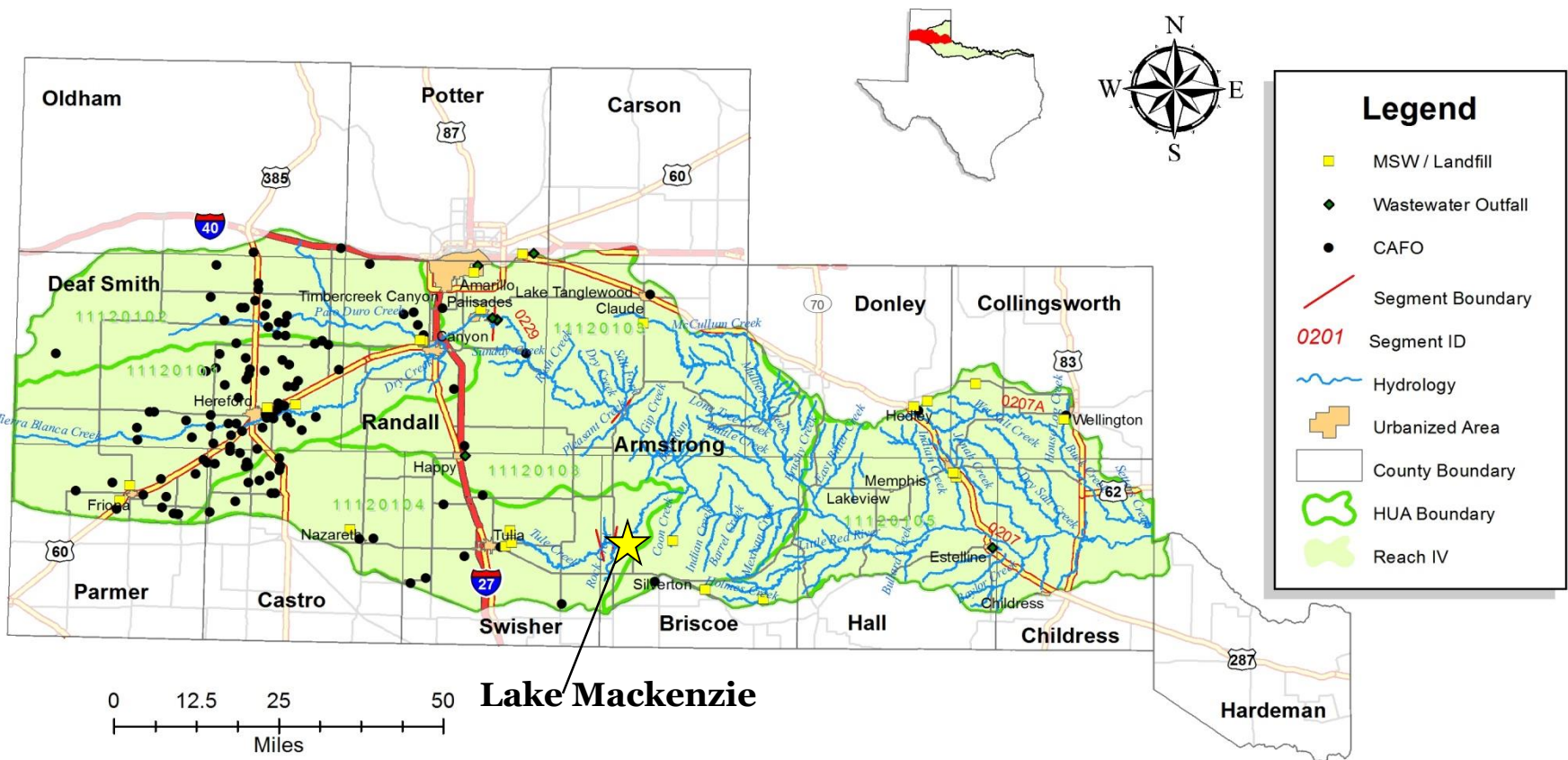


- Lower PDTF Red River (0207)
- Buck Creek (0207A)
- Mackenzie Reservoir (0228)
 - TDS impairment
 - No concerns
- Upper PDTF Red River (0229)
- Lake Tanglewood (0229A)

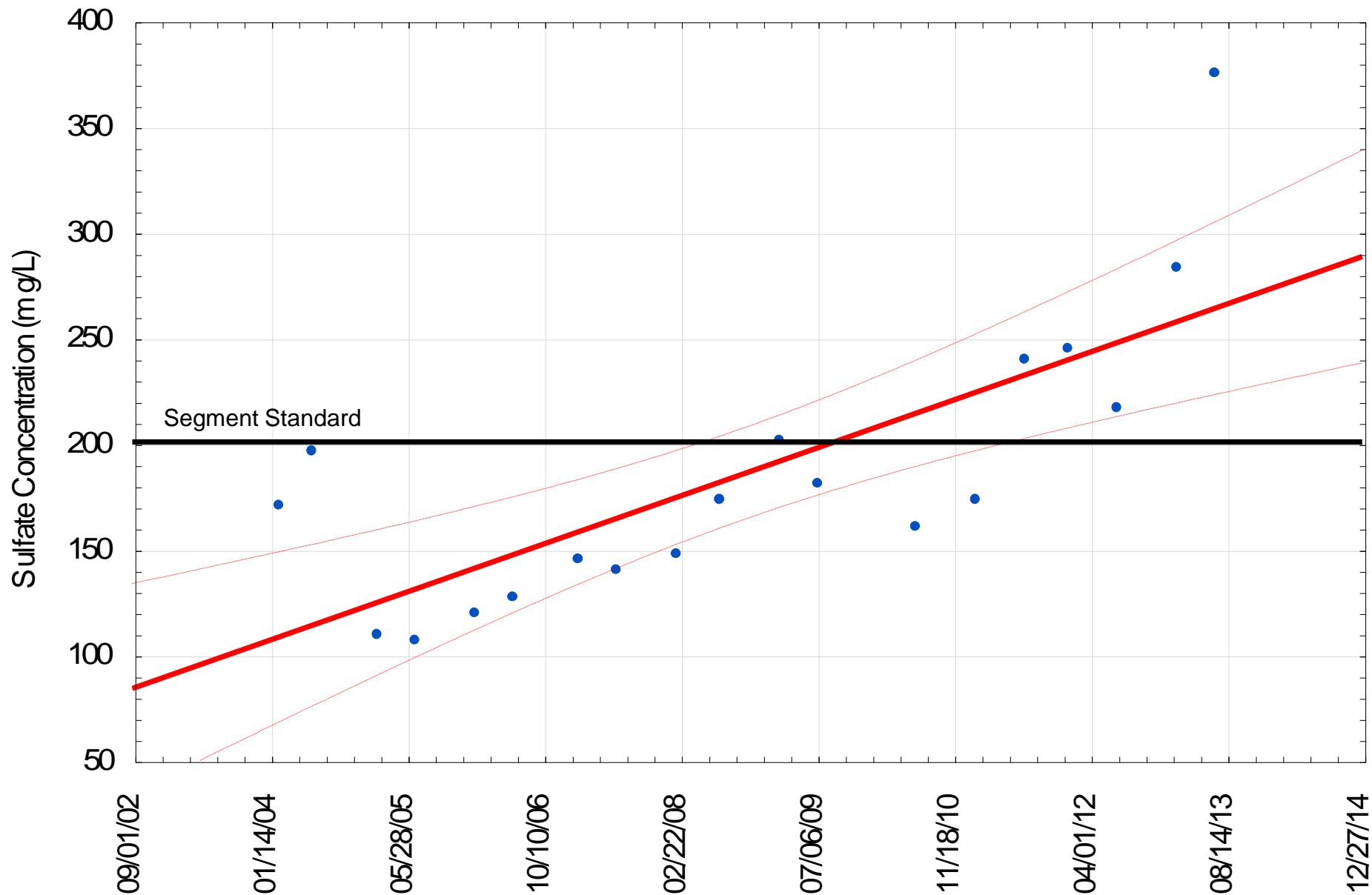


Red River Basin

Reach IV



Mackenzie Reservoir
Segment0228_01
Sulfate



Red Reach IV

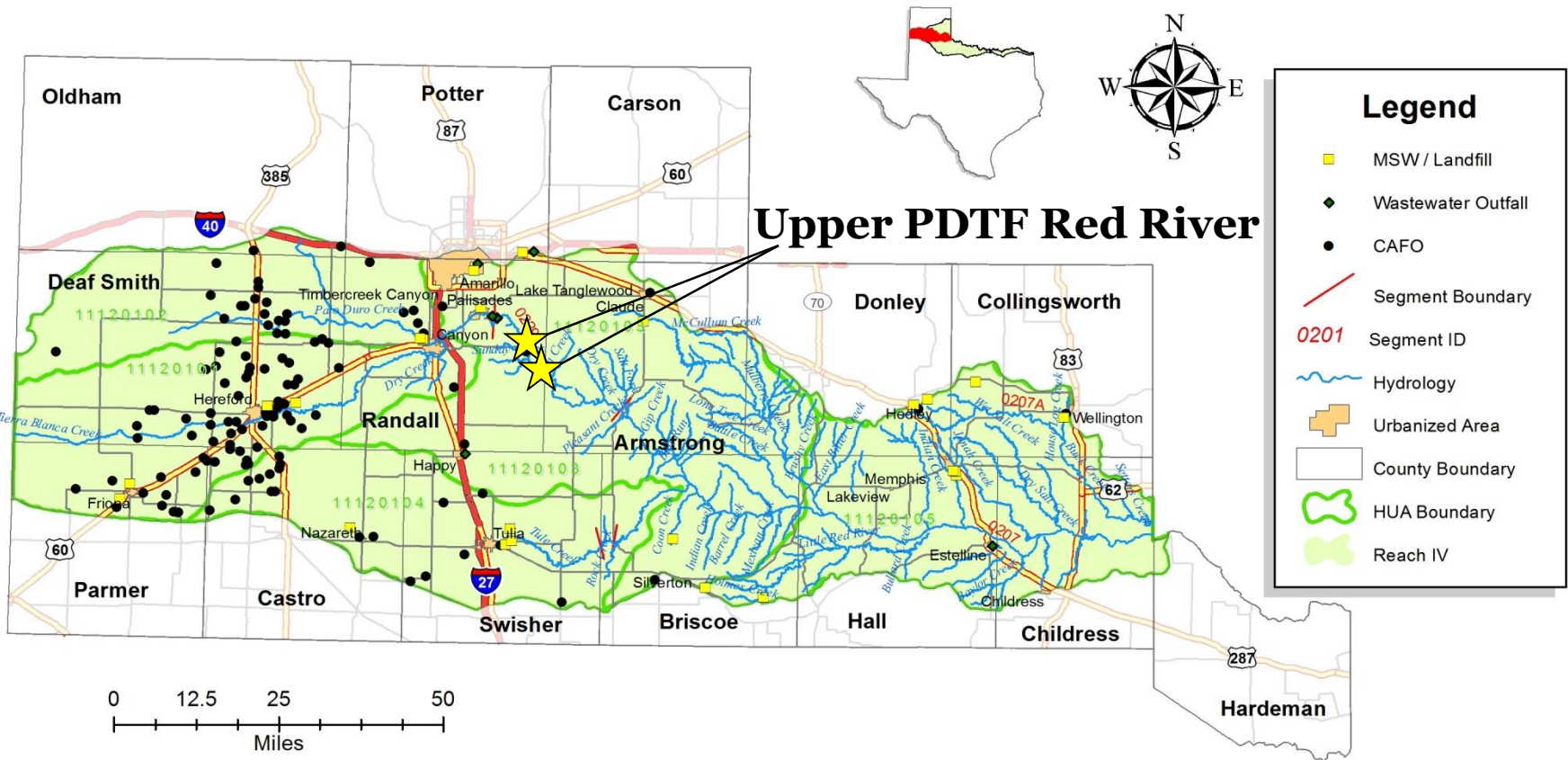


- Lower PDTF Red River (0207)
- Buck Creek (0207A)
- Mackenzie Reservoir (0228)
- Upper PDTF Red River (0229)
 - pH impairment
 - Chlorophyll-*a*, nitrate, bacteria, depressed DO, and total phosphorus concerns
- Lake Tanglewood (0229A)



Red River Basin

Reach IV



Red Reach IV



- Lower PDTF Red River (0207)
- Buck Creek (0207A)
- Mackenzie Reservoir (0228)
- Upper PDTF Red River (0229)
- Lake Tanglewood (0229A)
 - No impairments
 - Ammonia, chlorophyll-*a*, depressed DO, nitrate, total phosphorus concerns

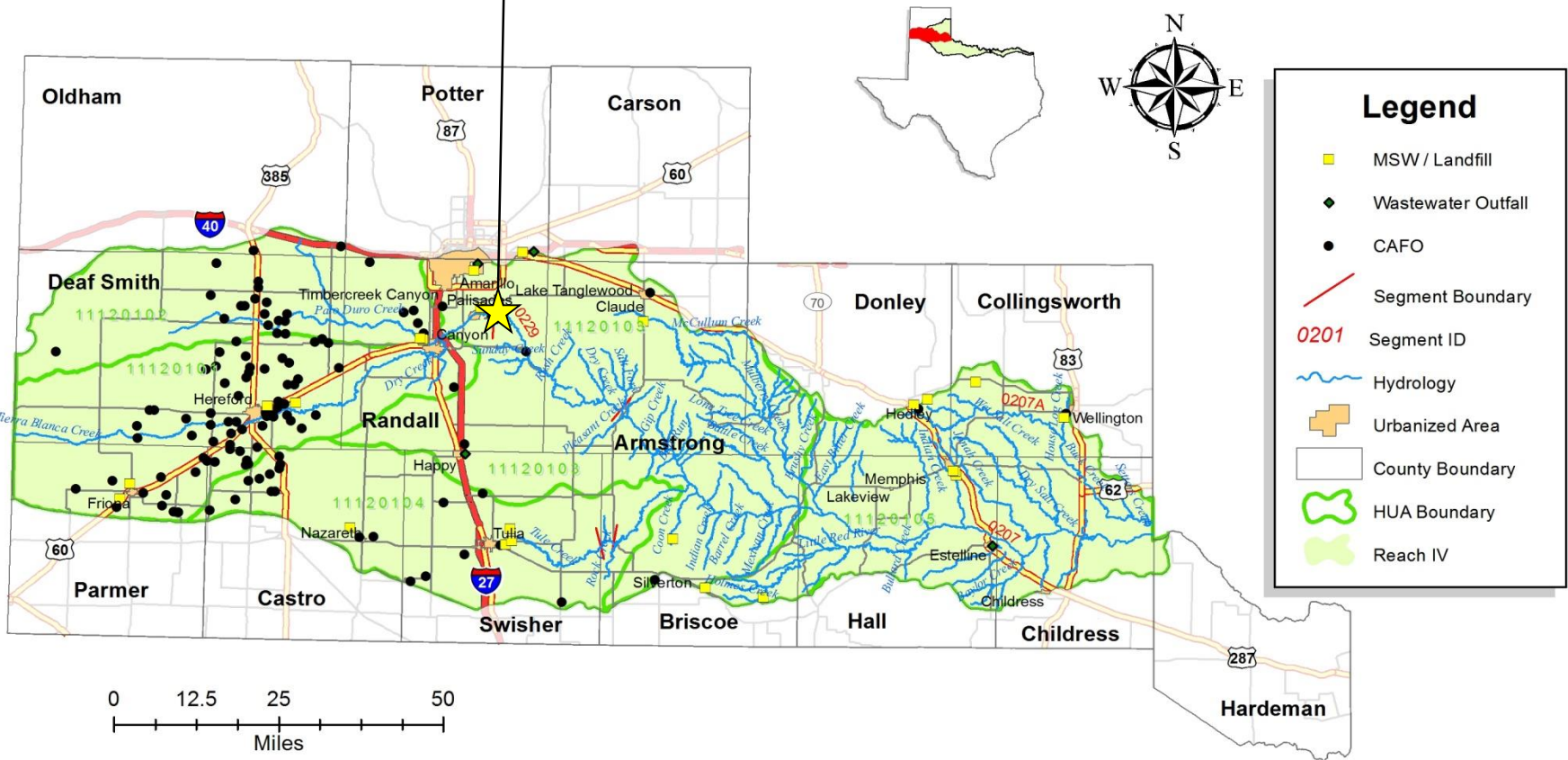


Red River Basin

Reach IV



Lake Tanglewood



Red Reach V

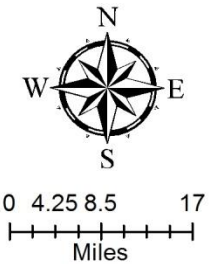
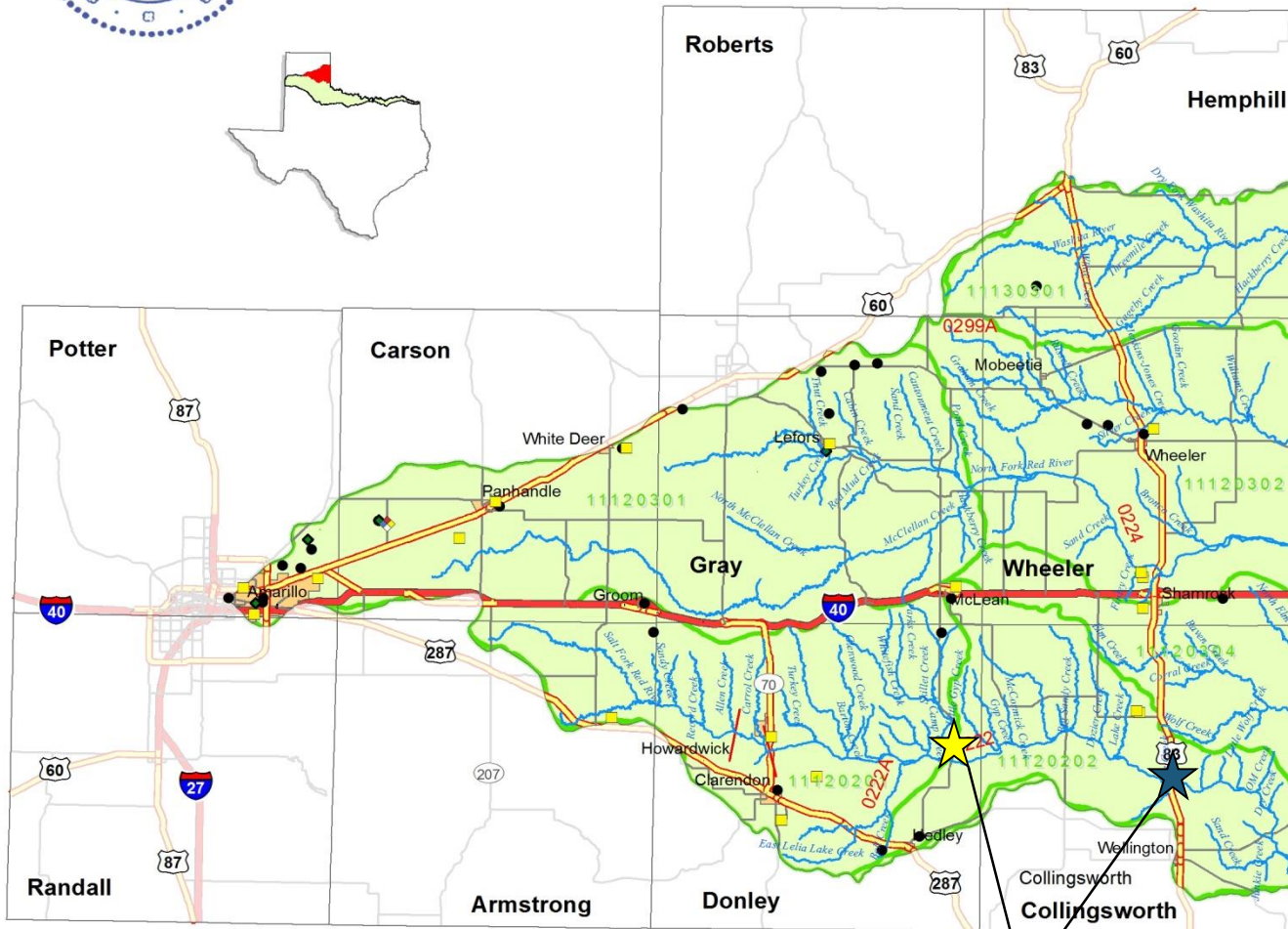


- Salt Fork of the Red River (0222)
 - Bacteria impairment
 - Nitrate concern
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork Red River (0224)
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)



Red River Basin

Reach V



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

Salt Fork Red River

Salt Fork Red River at US 83 – 1/18/2017



Red Reach V



- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
 - No impairments or concerns
 - Proposed Least Disturbed Stream Study
- Greenbelt Lake (0223)
- North Fork Red River (0224)
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)

Red Reach V



- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
 - No impairments or concerns
- North Fork Red River (0224)
 - No impairments or concerns
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)

Red Reach V



- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork Red River (0224)
- McClellan Creek (0224A)
 - Bacteria Impairment
 - No Concerns
- Sweetwater Creek (0299A)

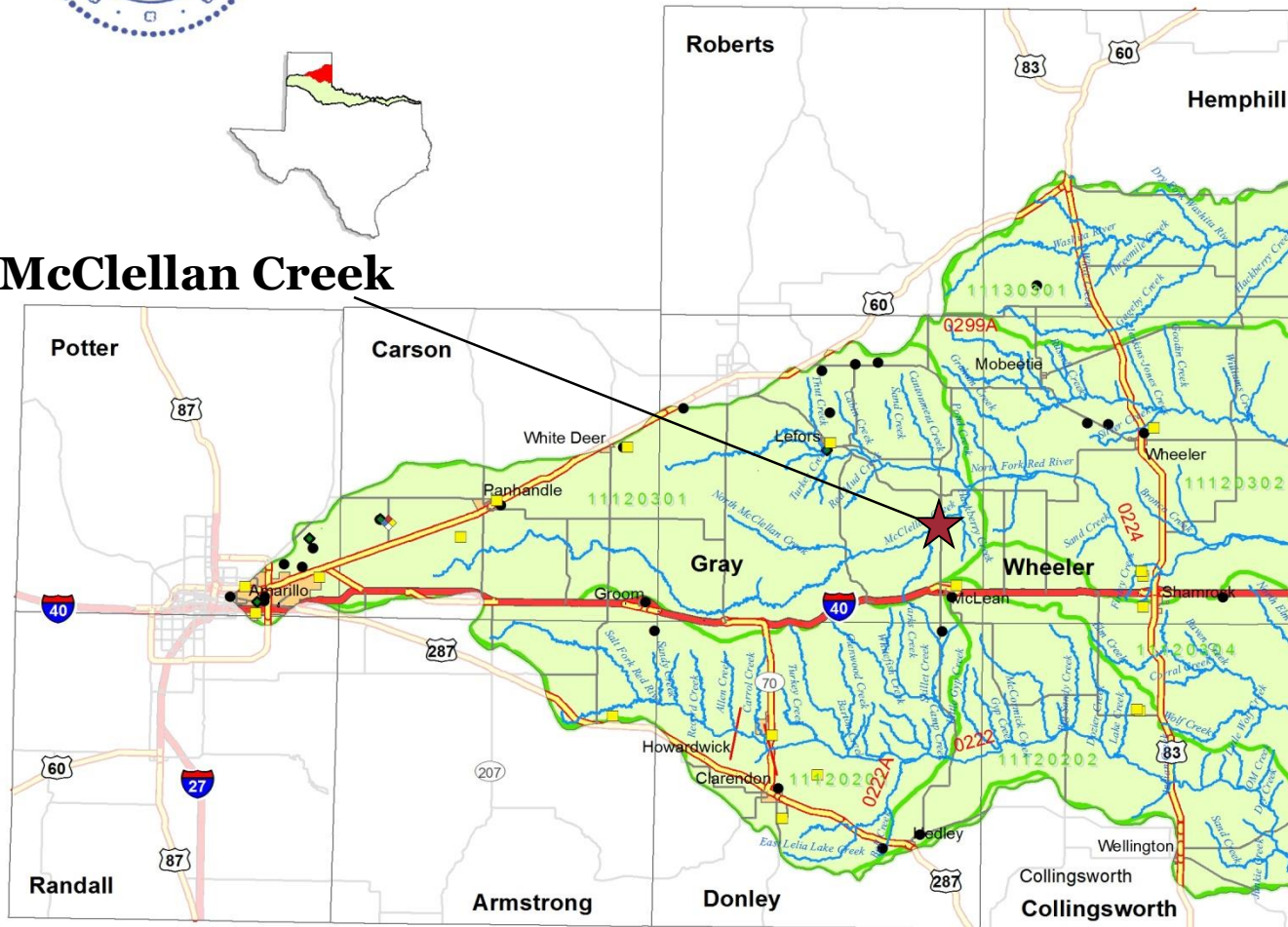


Red River Basin

Reach V



McClellan Creek



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

McClellan Creek at SH 273 – 10/4/2017



Red Reach V

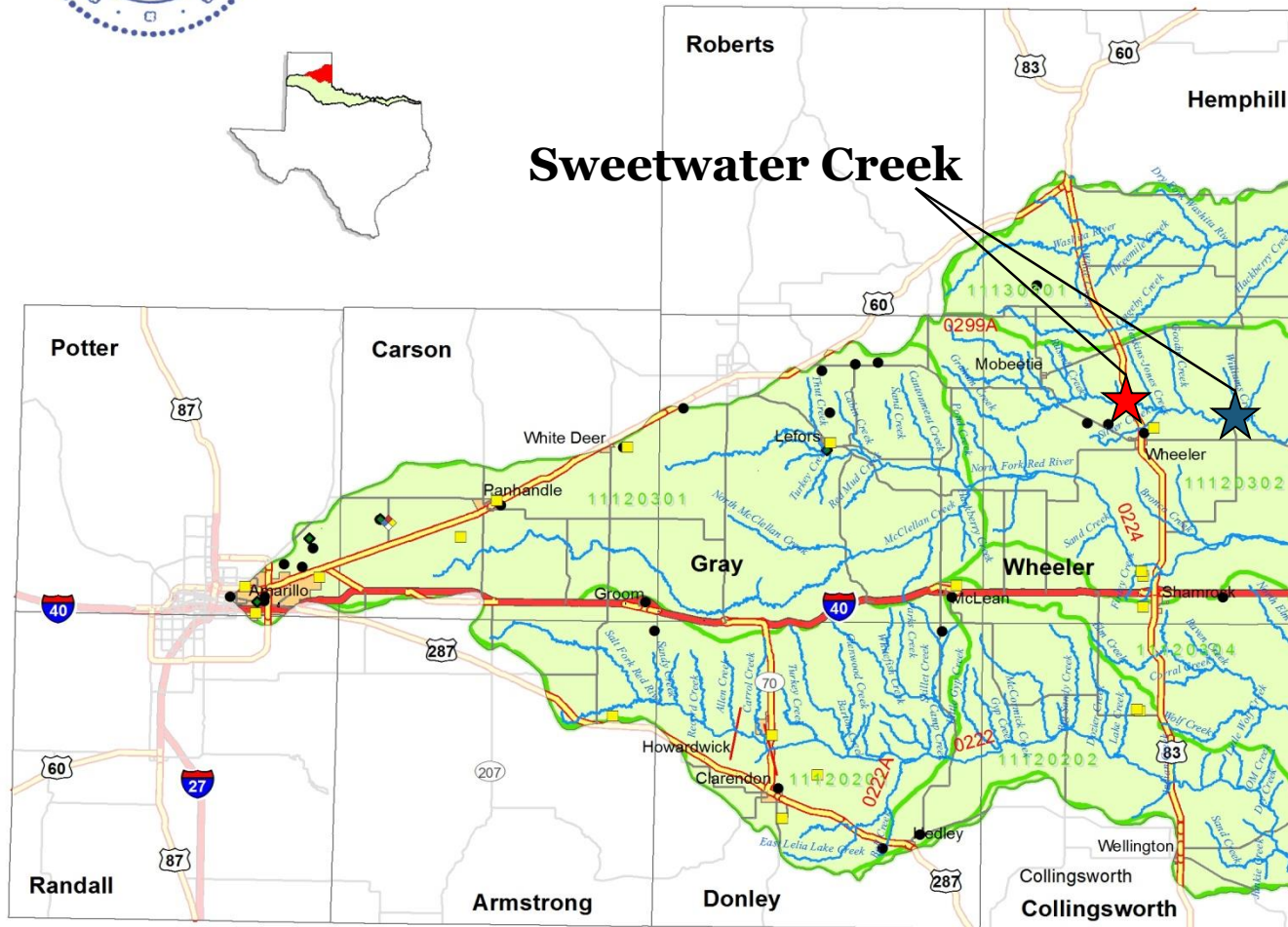


- Salt Fork of the Red River (0222)
- Lelia Lake Creek (0222A)
- Greenbelt Lake (0223)
- North Fork Red River (0224)
- McClellan Creek (0224A)
- Sweetwater Creek (0299A)
 - No impairments
 - No concerns
 - RUAA has been completed and submitted to TCEQ
 - Proposed Least Disturbed Stream Study – May 2018



Red River Basin

Reach V



Legend

- MSW / Landfill
- Wastewater Outfall
- CAFO
- Superfund Site
- Segment Boundary
- 0201 Segment ID
- Hydrology
- Urbanized Area
- County Boundary
- HUA Boundary
- Red Reach V

FY2019 Goals



- Continue to educate the general public on the conservation and protection of this precious natural resource.
- Continue to increase the number of Clean Rivers Program monitoring partners, increasing the amount of water quality data, thus aiding future assessments.
- Pursue additional monitoring locations to aid in identifying impaired water bodies.
- Continue to collect *Enterococcus* data on streams with elevated conductivity to better assess the presence of bacteria.
- Continue Biological Monitoring during FY19

Questions?



RED RIVER AUTHORITY OF TEXAS



Clean Rivers
Program
Partner Since
1991



NELAP
Accredited
Laboratory
Since 2006

Contact Information

P.O. Box 240, Wichita Falls, Texas 76307

Phone Number: (940) 723-8697 • Fax Number: (940) 723-8531

Hours of Operation: Monday –Friday 8:00 –5:00 • Emergency Laboratory Services: (940) 636-8024

Website - <http://rra.texas.gov/>